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DISEASES CAUSED BY BACTERIA AND FUNGI.

WEIDLICH, N. (1933). Bericht über die im Jahre 1932 in Karpathenrussland vorgenommenen Milzbrandschutz-impfung mit Glukosidkulturen. **[Report of Glucoside Vaccine Anthrax Immunization in Eastern Czechoslovakia in 1932].**—*Prag. Arch. Tiermed.* **13.** 203-214. 1 table. [6 refs.] [Translation of paper in Czech : see this *Bull.* **4.** 410].

EICHHORN, A., & LYON, B. M. (1934). **A New Method of Immunization against Anthrax.**—*J. Amer. Vet. Med. Ass.* **84.** 225-232. 3 tables. [2 refs.]

The authors claim that animals can be successfully immunized against anthrax by injecting culture treated with 2·5 per cent. saponin. In this way a vaccine of high antigenic potency is obtained which confers a high degree of protection. [This is Mazzuchi's " carbozoo " vaccine—this *Bull.* **2.** 197].—S. J. EDWARDS.

I. CUMMINS, S. L., & WEATHERALL, Cicely. (1933). **The Effects of Colloidal Silica on Experimental Tuberculosis in Guinea Pigs.**—*J. Hyg. Cambridge.* **33.** 295-306. 7 tables. [4 refs.]

II. SAENZ, A. (1933). Sur les modifications de virulence des cultures de Bacilles tuberculeux aviaires, révélées par l'étude par des colonies dissociées. **[Modification in Virulence of Avian Strains of Tubercle Bacilli as shown by Dissociated Colonies].**—*C. R. Soc. Biol. Paris.* **113.** 1503-1505.

III. NÈGRE, L. (1933). Action des lipides des organes sains des mammifères sur l'évolution de la tuberculose expérimentale du cobaye et du lapin. **[Effect of Lipids Extracted from Normal Mammalian Organs on the Development of Experimental Tuberculosis in the Guinea Pig and Rabbit].**—*Ann. Inst. Pasteur.* **51.** 697-706. 3 figs. [4 refs.]

I. In view of the experiments of GYE and KETTLE [(1922). *Brit. J. Exp. Path.* **3.** 241.] on the effect of the subcutaneous inoculation of tubercle bacilli admixed with silica, on the dissemination of the organisms, the authors studied the local and general effects of similar mixtures in guinea pigs. Their results, in the main, confirm the findings of GYE and KETTLE, viz., that silica induces a marked increase in the local reaction and a greater pullulation of the organisms within the first few days of the injection. With regard to the spread of the organisms from the local

lesion, it was found that in a series of 21 guinea pigs inoculated by various routes with tubercle bacilli, with and without silica and kept until death from *M. tuberculosis* infection supervened, the average survival period with bacilli alone was 127 days as compared with 101 days with the bacilli plus silica series. The differences were so slight that they are regarded as insignificant.

II. Three avian strains which had undergone a considerable debasement in their virulence were dissociated into S and R forms by the subcutaneous inoculation of guinea pigs followed by the transference of the pus from the local lesion to Löwenstein's medium. The two types of colony were then tested on fowls. The S cultures were fully pathogenic while the R forms were practically avirulent. The author notes that avian strains kept on glycerine potato often rapidly lose their virulence, but on Löwenstein's medium they remain fully virulent.

III. Having shown that certain fatty compounds such as olive oil and cod liver oil tend to accelerate the dissemination of *M. tuberculosis*, the author has studied the effects of tissue lipids. Various organs from normal guinea pigs and rabbits were treated with acetone and the extracts thus obtained were inoculated into guinea pigs and rabbits previously infected with *M. tuberculosis* (Vallée). On autopsy, the lesions in the treated animals were slightly more extensive than in the controls. Similar results were obtained with extracts of bovine lymphatic glands.

—R. E. GLOVER.

SCHIEL, O. (1933). Weiterer, Dritter, Vierter, und Fünfter Beitrag zur Intensivierung des Tuberkulosebekämpfungsverfahrens. [**Development of Tuberculosis Control (Bovine). Parts 2, 3, 4 & 5**].—*Zschr. Infektkr. Haust.* **45.** 36-71. 6 tables. [21 refs.] [For abst. of Part 1 of this series see this *Bull.* **1.** 98].

The author tested the value of the examination of bronchial secretion for the presence of tuberculosis of the lung. Of 171 cattle belonging to five herds, 42 were clinically suspicious and of these 18 (42·8 per cent.) were detected either by microscopic examination of the discharge, or by inoculation into guinea pigs ; 129 cattle were not obviously affected, but the discharges of 27 (20·9 per cent.) contained tubercle bacilli. In support of previous observations [this *Bull.* **1.** 98.] the author considers that this test, in conjunction with clinical examination, is of great value in the control of open tuberculosis. In applying control measures to five other herds, the author found that the bronchial secretion of apparently normal animals frequently contained tubercle bacilli and he directs attention to this fact in considering the potential sources of infection.—S. J. EDWARDS.

DE VRIES, L. P. (1933). De Paratuberculose in Friesland. [*Mycobact. paratuberculosis* **Infection in Friesland**].—*Tijdschr. Diergeneesk.* **60.** 352-355.

An account of Johne's disease in Friesland and a discussion on how to prevent its spread. Questionnaires were sent out to veterinarians in the province and from the replies it appeared that the disease is favoured by moist, sandy soil intermixed with peat.

Infection spreads in the stable and out-of-doors by contact. Calves are especially prone to infection. A good diagnostic agent is required and tests are now being performed with Dunkin's johnin.—B. J. C. TE HENNEPE (ROTTERDAM).

BULL, L. B., & DICKINSON, C. G. (1933). **Studies on Infection by, and Resistance to, the Preisz-Nocard Bacillus. III. Some Preliminary Observations on**

Experimental and Natural Infections of the Sheep.—*Austral. Vet. J.* **9.** 82-93. 3 tables. [13 refs.] [For absts. of previous articles of this series see this *Bull.* **3.** 120].

This paper is divided into two parts.

PART I. During experiments on vaccination against caseous lymphadenitis it was found that lesions in lymph glands and internal organs develop in only a small proportion of lambs which have been infected by small doses of bacillary suspension inoculated subcutaneously or by contaminating wounds with diluted pus. A satisfactory experimental method of producing caseous lymphadenitis in sheep, except by the parenteral inoculation of overwhelming doses, has not yet been devised.

PART II. Field observations suggested that infection was being acquired from the soil. The Preisz-Nocard organism was recovered from samples of soil taken from sheep camps in the paddocks during the spring. Infection was set up by rubbing soil into wounds in guinea pigs, which subsequently developed lesions in lymph glands or viscera from which the organism was isolated. After the soil had become dry during the summer, the Preisz-Nocard organism could no longer be demonstrated. It has also been demonstrated in the faeces of sheep with infected lymph glands. It is suggested that the soil becomes infected from such faeces and that the organisms may multiply in the soil under suitable conditions, thus explaining the heavy infection encountered in soil.—W. I. B. BEVERIDGE.

I. CREECH, G. T. (1933). **Experimental Studies in the Transmission of Swine Erysipelas.**—*Vet. Med.* **28.** 403-406. 2 figs., 3 tables.

II. LAPORTE, A., & FRIEDMAN, E. (1933). L'infection expérimentale du cobaye par le bacille du rouget. [**Experimental Swine Erysipelas in the Guinea Pig**].—*Rev. Path. comp.* **33.** 1441-1450. 1 fig., 6 charts. [4 refs.]

III. GORET, P., BABIN, A., & CAMARA, A. (1934). L'infection expérimentale du Cobaye par le Bacille du rouget. [**Experimental Swine Erysipelas in the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **115.** 386-388. [2 refs.]

I. Twenty-two pigs, whose blood gave a negative result to the agglutination test for *Erysipelothrix rhusiopathiae*, were artificially infected with cultures. Five pigs died, and the organism was recovered from the spleen, liver, kidneys, blood, etc. Six pigs survived after showing symptoms of the disease ; their blood cultures were negative except in two cases, when the organism was found in cultures on the fourth day. Eleven pigs (50 per cent.) showed no symptoms of erysipelas. Five of the pigs were infected by feeding with cultures, one died and the remainder were not infected. The other pigs were infected by intravenous, intraperitoneal and subcutaneous inoculation.

II. Broth cultures, after passage through mice and pigeons, were inoculated into guinea pigs by the following methods :—intracardially, *via* the ileocaecal gland, mesenteric gland and the marrow cavity of the left femur. By using a virulent strain of the organism, it was found possible to produce an infection in the guinea pig varying from a slight rise in temperature to death. During the course of the disease critical symptoms appear about the seventh day ; this coincides with the disappearance of the organisms from the internal organs. Animals which have recovered develop an immunity as in the case of inoculation with dead cultures. The course of the disease in the guinea pig closely resembles that seen in human pathology.

III. These authors confirm the findings of LAPORTE and FRIEDMAN that, whilst the guinea pig is resistant to swine erysipelas, the resistance can be broken down by inoculation with virulent cultures of the organism. In the work now

described infection was achieved by inoculation into the skin and into the testes. Inflammation of the gall-bladder with diffuse peritonitis and the presence of a haemorrhagic serous exudate in the abdominal cavity resulted in the test animals. A characteristic lesion was hypertrophy of the suprarenals with petechial haemorrhages into the capsules. The disease in guinea pigs was of a septicaemic nature.

—D. J. ANTHONY.

I. KONNO, T., & GOTO, Y. (1933). Ueber den Wert der Frischblut-Schnellagglutination zur Ermittelung von Pulloruminfektion der Hühner. [**Value of Fresh Blood Rapid Agglutination in** *Bact. pullorum* **in Fowls**].—*8th Rep. Govt. Inst. Vet. Res. Fusan, Japan.* pp. 33-42, 2nd ser. 5 tables. [6 refs.] [Orig. in German].

II. KONNO, T., & GOTO, Y. (1933). **Precipitating Power of Serum of** *B. pullorum* **Infected Fowls in Connection with Agglutination.**—*J. Jap. Soc. Vet. Sci.* **12.** 53-59. 5 tables. [Orig. in Japanese: abst. from author's summary in German].

III. —. (1933). **An Apparatus for Pipetting Serum in Making the Agglutination Test for the Detection of Carriers of Bacillary White Diarrhoea.**—*Vet. Rec.* **13.** 966-968. 5 figs. [1 ref.]

IV. YOSHIHARA, R. (1933). Einfluss der Hitze auf Rezeptoren von B. pullorum. [**Influence of Heat on Receptors of** *Bact. pullorum*].—*Zschr. Immun.-Forsch.* **78.** 483-488. 5 tables.

V. KONNO, T., & ZAIZEN, K. (1933). Ueber Komplementbindungsversuch bei den Seren pulloruminfizierter Hühner, im Zussamenhang mit der Präzipitation. [**Diagnosis of** *Bact. pullorum* **Infection by Complement-Fixation and Precipitation**].—*J. Jap. Soc. Vet. Sci.* **12.** 129-134. 3 tables. [Orig. in German].

I. Seventy-four fowls were tested for *Bact. pullorum* infection by the tube agglutination and the rapid agglutination tests. A *post-mortem* examination was subsequently held on these birds and their tissues were cultured. By the tube method a titre of 1 : 100 or over was taken as evidence of infection. Five birds with this titre showed no lesions and culture was negative. When examined by the rapid method, all birds whose sera showed obvious flocculation within 60 seconds either showed lesions or cultures were positive. Those whose sera took longer than 60 seconds to flocculate showed no lesions and were negative culturally.

II. The precipitating power of fowl sera [measured by Ascoli's ring technique] is of approximately equal value to the rapid agglutination test for the detection of infection with *Bact. pullorum.* [Possibly the precipitin test would be rendered more sensitive if attention was paid to the " optimal proportion " of antigen and antibody].

III. This article describes an automatic pipetting apparatus which is an adaptation of that described by BEAUDETTE [(1929). *Cornell Vet.* **19.** 377.] for transferring serum to the saline dilution tubes of agglutination tests. It is not possible to abstract this article. It is claimed that one worker, using this apparatus, can handle 400 to 600 samples an hour [excluding the addition of bacterial suspension]. There is also an illustration of an apparatus for adding bacterial suspension to agglutination tubes at the rate of 4,000 an hour.

IV. Agglutination of cultures of " non-specific " *Bact. pullorum* by anti-typhoid, anti-Gärtner and anti-*typhi muris* sera is described. [Since *Bact. pullorum*, *Bact. typhosum* and *Bact. enteritidis* have a common O antigen, cross-agglutination would be expected. *Bact. typhi muris* may have been a strain of

Bact. enteritidis also having a common O antigen with *Bact. pullorum* ; the name *typhi muris*, however, is generally applied to *Bact. aertrycke*. The heat stability of the O antigen has long been known].

V. The complement-fixation and precipitin tests agreed in a large proportion of cases when used to diagnose *Bact. pullorum* infection.—E. J. PULLINGER.

ROHONYI, M. (1933). A fertozo elvetélés elleni védekezo eljarasok. [**Protection against Contagious Abortion**].—*Allatorv. Lapok.* **56.** 60-62. [4 refs.] [A German translation appeared in *Wien. tierärztl. Mschr.* **20.** 796-801 : abst. from the latter].

The author discusses the advantages and disadvantages of dead and live vaccines against contagious abortion. He advances the theory that the subcutaneous inoculation method is faulty and dissimilar to the way by which infection is naturally acquired. He advocates the use of an avirulent live vaccine *per os*, but no such method has as yet been used in Hungary.

With regard to chemotherapy, reference is made to LÖBL's use of resorcin and his claim that it reduced the number of abortions and resulted in the disappearance of agglutinins.—J. E.

I. LARRIEU, L. (1932). Du traitement de l'avortement épizootique. [**The Treatment of Contagious Abortion**].—*Rev. Path. comp.* **32.** 308-310.

II. LARRIEU, L. (1932). Du traitement de l'avortement épizootique. [**The Treatment of Contagious Abortion**].—*Rev. vét. et J. Méd. vét.* **84.** 142-143.

I. The author recommends the inoculation of dead *Br. abortus* vaccine at the 30th and 45th days after service and fortnightly injections of 5 c.c. of a 5 per cent. solution of phenol during the last four months of pregnacy.

II. This is a *verbatim* report of I.—R. S. ROBERTS.

LIGNIÈRES, J. (1932). Sobre las cualidades patógenas del " Brucella melitensis " y del " Brucella abortus." [**Upon the Pathogenicity of** *Br. melitensis* **and** *Br. abortus*].—*Rev. zootéc. Buenos Aires.* **19.** 454-457.

The author reviews the literature upon the pathogenicity of brucella for human beings and bovines and quotes personal experiences in dealing with infectious material of bovine origin. His conclusions are that control measures should be directed against the dissemination of *Br. melitensis* and that the injection of bovines with live *Br. abortus* vaccine should be limited to herds where the existence of the disease has been definitely established.—R. S. ROBERTS.

I. NIEBERLE, K., & PALLASKE, G. (1933). Zur Kenntnis der geweblichen Reaktion des Meerschweinchens gegenüber der Bang-Infektion und ihrer diagnostischen Bedeutung. [**Tissue Reaction of the Guinea Pig to** *Br. abortus*].—*Arch. wiss prakt. Tierhlk.* **67.** 1-9. 3 figs. [13 refs.]

II. LÜBKE, A. (1933). Histologische Untersuchungen an Abortus-Bang-infizierten Meerschweinchen unter besonderer Berücksichtigung ihrer diagnostischen Bedeutung für die Feststellung Bang-bakterienhaltiger Milch. [**Histological Experiments on Guinea Pigs Infected with** *Br. abortus* **with Special Reference to the Diagnostic Importance for the Determination of Infected Milk**].—*Ibid.* 114-140. 3 figs., 11 tables. [18 refs.]

III. VAN DER HOEDEN, J. (1933). **Pathogenesis of Brucellosis Bang.**—*J. Comp. Path. & Therap.* **46.** 232-247. 9 tables. [10 refs.]

I. The authors describe the histopathology of the lesions in the spleen, lymphatic glands, liver and bone marrow of guinea pigs infected with *Br. abortus*. The lesions have a basis of epithelioid tissue similar in structure to that of the infective granulomata.

II. Lübke found that 28 days after intramuscular inoculation with minimal doses of culture (the longest period of observation) histological changes were present more constantly in the liver and popliteal lymphatic glands than in the spleen, and that porcine strains produced more extensive tissue change than bovine strains. The presence of brucella organisms in milk could invariably be determined within 18 days by the inoculation of guinea pigs and by making histological and cultural examination of the above organs and by the agglutination test of the blood.

III. Various animals were experimentally infected for the purpose of determining their individual susceptibility to *Br. abortus*. The organism was recovered from the blood of a horse up to three days after oral administration ; in a male goat, agglutinins were present in the blood seven days after infection and organisms cultured from the spleen after 35 days. With dogs, the organism was isolated from the spleen, liver, mesenteric glands and bone marrow 14 days after feeding with culture and even after 74 days the spleen still contained brucella. No infection occurred in a healthy puppy brought into contact with a dog orally infected on the previous day. Six to eight weeks after oral administration to guinea pigs, the organism could be regularly recovered from the spleen and with less certainty from the liver, kidneys and lymphatic glands. Instillation of culture into the conjunctiva was also followed by infection.—S. J. Edwards.

I. Gwatkin, R. (1933). **Brucella abortus Infection in Guinea-Pigs. Prevention and Treatment with Immune Serum.**—*J. Infect. Dis.* **53.** 230-236. [3 refs.]

II. Everson, C. L., Poelma, L. J., Brueckner, A. L., & Pickens, E. M. (1933). **The Portals of Entry of Brucella abortus in Guinea Pigs.**—*Cornell Vet.* **23.** 325-334. 1 table. [5 refs.]

I. Gwatkin reported in a previous publication [this *Bull.* **3.** 554.] that some immunity against *Br. abortus* infection was conferred on guinea pigs by injections of serum of naturally infected cows and immunized guinea pigs.

Multiple injections (five and six) of immune guinea pig serum protected guinea pigs against *Br. abortus* infection by mouth and eye while unprotected controls became infected ; 5 c.c. of serum from a naturally infected cow protected only one out of four guinea pigs ; the other three showed no lesions, but *Br. abortus* was isolated from two of them and the third showed a positive agglutination reaction.

Rabbit serum with an agglutination titre of 1 : 2,500 and a complement-fixing titre of 1 : 5,000 protected a group of guinea pigs against eye infection with *Br. abortus*. Another sample of rabbit serum failed to protect against a more virulent strain of *Br. abortus*.

Sera from artificially and naturally infected cows and from immunized guinea pigs failed to modify an established brucella infection in guinea pigs.

II. Everson and his co-workers carried out a series of experiments on guinea pigs to ascertain the possible routes of infection with *Br. abortus*. They found that bovine and porcine strains may set up infection by the following routes :—mouth, eye, nose, uretha, vagina, rectum, incisions, scarified skin and unabraded skin.

—T. M. Doyle.

DE SANTIS, Maria. (1933). Differenziazione di tipi nel gruppo "Brucella" mediante la coltura su terreni all'uovo. (Ricerche sperimentali.) [**Differentiation of Types of Brucella by Growth on Egg Media**].—*Boll. Ist sieroterap. Milan.* **12.** 846-858. [30 refs.] [English summary]. [Copied *verbatim* from *Bull. Hyg.* **9.** 286. Signed by G. S. WILSON].

Strains of *Br. melitensis* and *Br. paramelitensis* were found to grow freely on both Petroff's and Petragnani's egg medium (the former containing gentian violet, the latter malachite green). Growth on Petragnani's medium was accompanied by a change in colour from light to dark green, an almost black tinge being sometimes observed. Strains of *abortus* and *para-abortus*, on the other hand, failed to grow on either of these media. Evidence is brought to show that the inhibiting agent responsible was the white of egg in the medium and not either of the dyes. Only three strains of the porcine type were studied ; of these, two behaved like the bovine type, while the remaining strain grew on both media, but instead of turning Petragnani's medium a dark green, it produced a blanching effect. Some of the 64 *Brucella* strains examined were studied also for H_2S production and growth on thionin-containing agar. On the whole, the results were concordant, but not completely so.

BOSNIC, L. (1933). Prinos k poznavanju patologije i terapije, posebno seroterapije, tetanusa u konja. [**Pathology and Serotherapy of Tetanus in the Horse**].—*Vet. Arhiv.* **3.** 572-587. [37 refs.] [Abst. from German summary].

This article gives the results of the treatment of 60 cases of tetanus in horses at the Medical Clinic of Zagreb Veterinary Faculty. Nineteen horses recovered. Numerous drugs were used, but were found in general to be useless.

Tetanus antiserum combined with ether or chloroform anaesthesia [duration not given] is said to have given good results and it is said that the work showed that tetanus toxin could be removed from the brain by ether inhalations. The author states that he removed tetanus toxins from the brain of an artificially infected rabbit *in vitro* with ether.—J. E.

I. KRANEVELD, F. C., & DJAENOEDIN, R. (1933). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indie. IX. Het voorkomen van den gasbacil van Fraenkel in den darminhoud bij gezonde schapen en geiten. [**Anaerobic Infection of Domestic Animals in the Dutch East Indies. IX.** *Clostridium welchii* **in the Intestine of Healthy Sheep and Goats**].—*Ned.-Indisch. Blad. Diergeneesk.* **45.** 146-153. 1 table. [Summaries in English and German : abst. from orig.]

II. KRANEVELD, F. C. (1933). Anaërobe bacillen en de door hen veroorzaakte infecties bij de huisdieren in Nederlandsch-Indie. X. De pathogeniteit van den bacillus gigas, Zeissler en Rassfeld, 1929. [**Anaerobic Infection of Domestic Animals in the Dutch East Indies. X. Pathogenicity of** *Clostridium gigas* **Zeissler and Rassfeld, 1929**].—*Ibid.* 440-494. 3 photographs on 2 plates, 7 tables, 6 charts. [6 refs.] [Summaries in English and German : abst. from orig.]

[For abstracts of previous articles of this series see this *Bull.* **3.** 530, and **4.** 215 and 216].

I. The authors examined the contents of the rectum of 25 healthy sheep and 25 goats from the vicinity of Buitenzorg for the presence of *Cl. welchii* and isolated the organism from all 50 samples. In 9 of the 25 goat strains young cultures (18 hours) showed marked acidity in salicine broth (1 per cent.), which indicates the existence of special strains, able to ferment salicine.

II. (1) The author ascertained the pathogenicity of *Cl. gigas* Zeissler and Rassfeld for the following animal species :—horse, cattle, water-buffalo, sheep, goat, hog, dog, cat, guinea pig, rabbit, white laboratory rat, common Java rat (*Rattus rattus diardi* Jent.), white mouse, fowl, European and Java (perkoetoet) pigeon.

(2) The virulence of the different *gigas* strains can vary considerably without demonstrable cause, but cultures incubated *in vacuo* for 48 hours are nearly always notably more virulent than those incubated for only 24 hours. For the purpose of increasing the virulence it seems useless to add animal albumen to the medium.

(3) *Cl. gigas* can be considered as a definite toxin producer. Intramuscular infection of experimental animals leads sooner to a fatal end than subcutaneous inoculation.

(4) The *post-mortem* findings correlate with the duration of the experimental disease in that they are more prominent after a prolonged course. The most typical lesions are :—marked oedema of the subcutis and of the intra and intermuscular fibrous tissue on the injection site ; severe inflammation of the muscular tissue with eventual necrosis and, exceptionally, slight gas formation ; in the abdominal cavity and in the pericardium there is found a large quantity of a mostly clear transudate which, in the same way as the oedematous fluid of the subcutis, coagulates very soon when exposed to the air ; and hyperaemia of the mucosa of the stomach, especially the fundus, and of the gut, especially the small intestine.

—B. J. C. TE HENNEPE (ROTTERDAM).

VAN DER KAMP, C. J. G. (1933). Alcohol niet steeds bacterie-vrij. [**Alcohol is not always Bacteria-Free**].—*Tijdschr. Diergeneesk.* **60.** 1325-1327. [Summaries in English, French and German : abst. from orig.]

This article records the finding of an anaerobic bacillus in cultures prepared in the course of meat inspection. As the same organism was found on the bottom of a glass bottle used for storage of 95 per cent. alcohol, the author assumed that it was alcohol-resistant.—J. E.

SLAGSVOLD, L. (1933). Spesiell soppinfeksjon i huden hos gjet og sau (favus). [**Peculiar Fungoid Infection in the Skin of Goats and Sheep (Favus)**].—*Norsk Vet.-tidsskr.* **45.** 361-373. 16 figs. on 8 plates. [Summary in English : abst. from orig.]

A skin disease, called goat scab by skin dealers, is of common occurrence in the rainy parts of western Norway, especially in goats, but also in sheep ; it was described previously by NIELSEN. The author's examinations proved it to be a very common infection. The disorder is apt to develop in animals that live in damp sheds, or are constantly out in wet and cold weather. Dandruff and crusts from 0·5 to 1 cm. thick form on the head, ears and neck, down the back and on the flexor aspects of the joints of the extremities. No itching or great loss of hair is observed.

The fungus is found in the thickened layers of epidermis. It has been obtained in pure culture. It is cultivated best on neutral or faintly acid agar to which there has been added 0·5 to 1 per cent. maltose and 5 to 10 per cent. horse serum, or in broth with the same admixture. After one to two days very small colonies with long filamentous offsets can be seen. Towards the centre of the colony the diameter of the hyphae is 2 to 4 μ ; the peripheral ones are about 0·5 μ thick. The hyphae tend to divide into refractive segments containing granules,which are Gram-positive. As yet the species has not been determined ; it is probably a *Monilia*. On infection experiments with infected crusts and scales as well as with pure cultures, charac-

teristic lesions were obtained in sheep, goats, horses, cattle, guinea pigs, rabbits, rats and mice. There was a marked tendency for the lesions to heal unless the skin was kept moist, and irritated. The fungus remains capable of developing in dried skin and in cultures for six months both at room temperature and in cold store ; it is killed on heating for half an hour at 65°C. or for a short time at 100°C.

The disease is effectively controlled by protecting the animals against dirt and constant dampness, and by washing in spring and in autumn with ordinary parasiticide (cresol preparation or arsenic solution).

—H. C. BENDIXEN (COPENHAGEN).

ALBISTON, H. E. (1933). **Mycotic Dermatitis in the Calf.**—*Austral. Vet. J.* **9.** 107-109. 4 figs. [3 refs.]

This mycotic dermatitis [infection with *Actinomyces dermatonomus* Bull] has only previously been reported as occurring naturally in sheep. Natural infection in calves with apparently the same organism is recorded here. The fungus isolated showed general agreement with the organism obtained from this condition in sheep and the disease was produced by application of the culture obtained from calves to the lightly scarified skin of a sheep. Treatment with linseed oil and tincture of iodine brought about recovery in the calves.—W. I. B. BEVERIDGE.

DISEASES CAUSED BY PROTOZOAN PARASITES.

I. LEGG, J. (1933). **A Brief Review of the Piroplasms, with Special Reference to the Types Found in Australian "Red-water."**—*Austral. Vet. J.* **9.** 14-19. [4 refs.] [Paper read at General Meeting of the Australian Veterinary Association at Sydney, August, 1932].

II. SEDDON, H. R. (1933). **A Note on Piroplasmosis in New South Wales.**—*Ibid.* 19-20.

I. As indicated in the title, this paper begins with a very brief historical survey of the classical work of BABES, SMITH and KILBORNE, KOCH, THEILER, and others. The author then gives a summary of the discoveries made in elucidating the aetiology of redwater in Australian cattle.

Three species of piroplasms have been recorded, *Piroplasma* [*Babesia*] *bigemina*, a species resembling *Theileria mutans* first found by DODD and a species resembling *Babesiella argentina* first found by SOHNS, more recently recorded by FILMER. The morphology of each species is described. Strains of *B. bigemina* isolated in Queensland appear usually to be of mild pathogenicity. The role of the second species has not yet been determined, but it is probably of low pathogenicity. The third species, however, is associated with a virulent form of redwater which does not yield to treatment with trypan blue. This organism may be found alone or together with *B. bigemina*, but in either case is only found in small numbers in blood smears.

II. This is a summary of the remarks made by Seddon in opening the discussion on LEGG's paper.

Seddon records that two pure strains of piroplasms have been isolated by serial passage, *B. bigemina* and a species resembling *Th. mutans*. The latter appears to be non-pathogenic. A third strain of organism, probably a *Babesiella*, has been obtained, but it is not yet certain that it is pure. This strain produces a high temperature reaction, but no other symptoms and, so far, no deaths have resulted following the inoculation of cattle.—J. R. HUDSON.

I. Buck, M. (1933). Prémunition des zébus malgaches vis-à-vis des piroplasmoses et splénectomie chez un veau zébu. [**Immunity of Madagascan Zebus against Piroplasmosis and Splenectomy in a Zebu Calf**].—*Bull. Soc. Path. exot.* **26.** 919-922. 1 table.

II. Stylianopoulos, M., & Ananiadès, B. (1933). Contribution à l'étude de piroplasmoses en Grèce. IV. Les piroplasmoses bovines. [**Studies on Piroplasmosis in Greece. IV. Bovine Piroplasmosis**].—*Ibid.* 1153-1156. [1 ref.]

III. Sergent, Ed., Donatien, A., Parrot, L., & Lestoquard, F. (1933). Huitième et neuvième campagnes de prémunition contre les piroplasmoses bovines dans l'Afrique du nord (1930-1932). [**The Eighth and Ninth Campaigns for Immunization against the Bovine Piroplasmosis in North Africa (1930-1932)**].—*Ann. Inst. Pasteur.* **51.** 284-289. 1 table.

IV. Yakimoff, W. L., Nezwetaïeff, N. W., & Petunina, P. I. (1933). Die Blutparasiten des Zébu. [**The Blood Parasites of the Zebu**].—*Berl. tierärztl. Wschr.* **49.** 824-827. 4 tables.

I. The native zebu cattle of Madagascar have been regarded as immune to the various forms of piroplasmosis from which imported cattle suffer severely. It has been recorded that the zebus do contract a mild infection with *Babesia bigemina* and *Anaplasma marginale* as calves, and sometimes fatal relapses to the latter infection occur. This article records that, on splenectomy of a zebu calf in Madagascar and the injection of adrenalin, *B. bigemina*, *A. marginale* and *Theileria mutans* appeared in the blood although *Th. mutans* had not been recorded previously in the island.

II. This article records investigations into the prevalence and characteristics of the various forms of bovine piroplasmosis in Greece. *B. bigemina*, *B. berbera*, *A. marginale* and an organism resembling *Th. dispar* are all encountered particularly in Macedonia and Thrace. The infection with *B. berbera* is said to be very severe, causing a loss of 25 to 70 per cent. in native animals and a loss of 90 per cent. in imported cattle.

III. This article records the results of large-scale immunization of cattle against piroplasmosis and anaplasmosis in Algeria and Morocco. The immunization is carried out in two stages, the first being against the babesia infections and anaplasmosis, and the second against *Th. dispar*. For immunization against anasplasmosis, blood from animals in the incubation period of the disease was used, whilst for the piroplasm infections pure strains of the organism were used. Approximately 2,500 cattle were immunized during the two campaigns and the loss, which was mainly due to theileriasis, only amounted to 20 animals. The immunity conferred appeared to be satisfactory though some losses occurred later from theileriasis particularly in Morocco, where six deaths were recorded out of 324 animals inoculated.

IV. This article records studies on the infection of the zebu cattle of Transcaucasia with *Trypanosoma theileri* and *Spirochaeta theileri*, and concludes that these parasites of the zebu are identical with those of other cattle. Ten zebus were examined for *T. theileri* by the blood culture method and all of them were found to harbour the parasite.—U. F. Richardson.

Guerrero, R. P., & Patino, F. P. (1933). Anotaciones sobre las piroplasmoses bovinas de Colombia y su tratamiento. [**Bovine Piroplasmoses of Colombia and their Treatment**].—*Rev. Med. vet. Bogotá.* **5.** 609-617. 1 fig. [10 refs.]

Up to 1929 a disease of bovines in Colombia characterized by high temperature, haemoglobinuria and a rapidly fatal termination was believed to be due entirely

to *Piroplasma* [*Babesia*] *bigemina*. In 1929 and 1930 *Anaplasma marginale* and *Babesiella argentina* were shown to be responsible for a proportion of the cases. The authors have accumulated information from routine examination of blood smears and are of opinion that the only member of the sub-genus *Piroplasma* encountered in Colombia is *B. bigemina*. The sub-genus *Babesiella* is represented by an organism which is almost identical with *Babesiella argentina* and by a larger parasite which appears to correspond to *Babesiella major*. *A. marginale* appears to be the only member of the genus *Anaplasma*. The genera *Nuttallia* and *Theileria* have not been identified.

Trypan blue in doses of 1 mg. per 100 kg. body weight is found to be satisfactory in the treatment of *B. bigemina* infection. Following favourable reports upon the use of trypaflavine in the treatment of anaplasmosis in Brazil the authors, in 1931, applied this treatment to cases of piroplasmosis. Twelve bovines in an advanced stage of the disease were injected intravenously with 50 to 70 c.c. of 2 per cent. solution. Complete recovery occurred in three days. Since then 192 cases have been similarly treated and of these only two have died from the disease.

—R. S. Roberts.

I. Keane, J. S. (1933). **Canine Piroplasmosis.**—*J. Roy. Army Vet. Corps.* **5.** 16-17.

II. Sen, S. K. (1933). **The Vector of Canine Piroplasmosis due to** *Piroplasma gibsoni*.—*Ind. J. Vet. Sci. & Anim. Husb.* **3.** 356-363. 3 figs., 1 plate, 2 tables. [10 refs.]

III. Cuillé, & Darraspen. (1934). Considérations sur la piroplasmose du chien. [**Canine Piroplasmosis**].—*Rev. vét. et J. Méd. vét.* **86.** 38-41.

I. The advantages and disadvantages of the treatment of canine piroplasmosis by trypan blue, sulfarsenol, tryparsamide and novarsenobillon are briefly discussed and the author then describes the success obtained by the use of S.U.P. 36. The doses recommended are 0·5 c.c. for small dogs and 1 c.c. for large ones, given intramuscularly. From two to six injections may be necessary to effect a cure. These are given daily. Treatment is suspended as soon as the temperature returns to normal and continued if there is a recurrence of fever. The drug is reported to be non-toxic and perfectly safe in the above mentioned doses and in none of the cases treated did abscess formation occur.

II. This is a preliminary note on the experimental transmission of *Piroplasma* [*Babesia*] *gibsoni* by means of *Rhipicephalus sanguineus*. Only five dogs were used, three of which became infected, the remaining two dying of other causes.

No special precautions were taken to prevent the experimental animals from contracting a natural infection but, as the average period of incubation of the three dogs which became infected with *B. gibsoni* was 29 days, the author assumes that natural infection did not occur.

The methods employed by other workers for collecting the engorged ticks are briefly discussed and they are criticized on the ground that they appear to have been too haphazard, resulting in the loss of many of the parasites. The author devised an improvement on a method previously employed which consisted of a body coat, an Elizabethan collar, loose shackling of the hind legs and confinement of the parasites to a particular area of the body under the perforated lid of a tin, fixed to the body by means of collodion and Chatterton's compound. By means of this device all of the parasites were recovered in eight of the 11 feeding operations.

III. The existence of piroplasmosis of the dog is not confined to the region of Toulouse, but is distributed throughout the south-west of France. The reason for the non-recognition of the disease is the occurrence of many atypical forms,

chief among which are those affecting the respiratory apparatus, the digestive, nervous and muscular systems ; the ophthalmic form especially is observed.

The drug recommended above all others is trypan blue, prepared as previously described by the authors and they state that the parasites will not be destroyed unless the visible mucous membranes are coloured a distinct blue. If this discolouration of the membranes does not occur in two to four hours after the injection, a second and even a third dose should be given. It is stated that in no instance have any ill effects been observed, even after the injection of excessive doses of trypan blue.

Details of symptoms and lesions found in hyperacute cases are given.

—C. J. R. LAWRENCE.

I. PÉRARD, C. (1933). Sur le rôle des espèces non-sensibles dans la propagation des Coccidioses. **[The Role of Insusceptible Species in the Propagation of Coccidiosis]**.—*Bull. Acad. vét. France.* **6.** 206-208. [1 ref.]

II. HOARE, C. A. (1933). **Studies on Some New Ophidian and Avian Coccidia from Uganda, with a Revision of the Classification of the Eimeriidea.**—*Parasitology.* **25.** 359-388. 6 figs., 3 tables. [37 refs.]

I. Undeveloped *Eimeria stiedae* from a rabbit were fed to two dogs and the oocysts collected from the faeces. They were found to segment normally and to produce infection when administered to a susceptible rabbit.

II. Three new species of coccidia from snakes and one from a bird are described.

The author accepts the present classification of coccidia into the two sub-orders, *Eimeriidea* and *Adeleidea*. He discusses the possible bases upon which the sub-order *Eimeriidea* may be further divided into families, sub-families and genera and concludes that, in the absence of information concerning the endogenous stages of development of many of the species, it is necessary to adhere to the present basis, namely, the structure of the fully segmented oocyst. Since the discovery by RAY in 1930 of a coccidium whose oocyst contained 16 sporozoites in four sporocysts and, as the oocyst of one new species described in the present paper segments into 16 sporozoites in two sporocysts, it would be necessary to add a further group to the three groups into which the *Eimeriidea* are at present divided. The alternative suggested by the author is to divide the sub-order into two families, namely, *Selenococcidiidae*, containing the one genus *Selenococcidium*, and *Eimeriidea*. The families in the latter would be separated according to the number of sporocysts in the infective oocyst, and the genera according to the number of sporozoites in the sporocyst.—R. S. ROBERTS.

BECKER, E. R. (1933). **Cross-Infection Experiments with Coccidia of Rodents and Domesticated Animals.**—*J. Parasitol.* **11.** 230-234. [6 refs.]

Albino rats, bred free from coccidia, were fed with infective oocysts of coccidia from a rabbit, a pig, a sheep, a calf and a chicken. No infection occurred. Oocysts from a rat, a pig and a rabbit failed to infect white mice. Oocysts from a rat and a rabbit did not infect guinea pigs. Oocysts of two rat strains did not infect ground squirrels. Oocysts from guinea pigs did not infect albino rats. Oocysts from rats did not infect a North American cotton-tail rabbit. *Eimeria magna* from a Belgian hare developed and caused pathological symptoms in a North American cotton-tail rabbit. These two rodents are zoologically distinct and do not interbreed.

The coccidia dealt with were all of the genus *Eimeria* and where possible it was ascertained that they were pathogenic for their specific host.—R. S. ROBERTS.

MARTÍNEZ, C. R. (1933). El haemoproteus columbae. (Nota parasitologica). [*Haemoproteus columbae*. **Parasitological Note**].—*Trab. Inst. Biol. anim. Madrid.* **1.** 96-98. 2 figs.

This article gives a brief description of the morphology and life cycle of *H. columbae*, and records the detection of the parasite in Spain. Carrier pigeons belonging to the corps of signallers at Guadalajara were found to be infected.

—U. F. RICHARDSON.

I. KONNÓ, M., & PIERAERTS, G. (1933). Obtention, à partir d'un *Trypanosoma rhodesiense* polymorphe, d'une souche sans noyau postérieur. [**The Production from a Polymorphic Strain of** *Trypanosoma rhodesiense* **of a Strain without a Posterior Nucleus**].—*Bull. Soc. Path. exot.* **26.** 1261-1263. [6 refs.]

II. WALLACE, J. M. (1933). **The Polymorphic Trypanosomes of Damba Island, Victoria Nyanza. III. Their Reactions in Laboratory Animals.**—*Ann. Trop. Med. & Parasitol.* **27.** 553-567. 7 tables. [11 refs.]

III. DUKE, H. L. (1933). **Studies on the Factors that may Influence the Transmission of the Polymorphic Trypanosomes by Tsetse. VII.** *T. rhodesiense versus T. gambiense* : **A Comparison of their Power to Develop Cyclically in Glossina.**—*Ibid.* 569-584. 4 tables. [7 refs.] [For abstracts of previous articles of the series of which II & III are parts see this *Bull.* **4.** 163 and 425].

I. This article records experiments undertaken to produce variants in a polymorphic strain of *T. rhodesiense* obtained from the Liverpool School of Tropical Medicine. After unsuccessful results with infections produced from animals that had been allowed to die and from infections with diluted virulent blood, a variant strain without posterior nuclear forms was obtained by infection from single trypanosomes, isolated by the capillary tube method. The strain obtained maintained its morphological modification through 15 passages. Long forms of the trypanosome predominated, medium and short forms being rare, and the alteration in morphology was associated with an increased virulence for laboratory animals.

II. This article records further investigations into the relationship of the Damba Island trypanosomes with *T. gambiense* and *T. brucei*, and into the suggestion that the prolonged residence of *T. gambiense* in game leads to a modification of its characters and a gradual return to the *T. brucei* type. Three strains of polymorphic trypanosomes isolated from wild *Glossina palpalis* in 1932 were tested for their virulence to laboratory animals, their susceptibility to human serum and atoxyl, and their reaction to the red cell adhesion test with *gambiense*, *rhodesiense* and *brucei* plasma. It is concluded that the Damba Island strains isolated in 1911 and 1920 were intermediate between typical *T. gambiense* and typical *T. brucei* and there is some indication that a modification towards *T. brucei* is still occurring.

III. This article discusses the relationship between *T. gambiense*, *T. rhodesiense* and *T. brucei* and records experiments on their relative powers of developing cyclically in glossina. The strains of *T. rhodesiense* were, on the whole, more readily transmitted than *T. gambiense*. The number of *T. brucei* strains was too few to give conclusive results. It appears that the individual mammalian host may influence the transmissibility of a trypanosome strain. A mild strain of *T. gambiense* obtained from man, from the Congo, was readily transmissible by *G. palpalis* and it is suggested that in that case a degree of adjustment to man had been reached similar to the adjustment of *T. brucei* to game.—U. F. RICHARDSON.

I. FAIRBAIRN, H. (1933). **The Action of Human Serum *in vitro* on Sixty-Four Recently Isolated Strains of *T. rhodesiense*.**—*Ann. Trop. Med. & Parasitol.* **27.** 185-205. 3 tables. [6 refs.]

II. DUKE, H. L. (1933). **A Study of the Behaviour of *T. rhodesiense* Recently Isolated from Man, in Antelope and Other African Game Animals.**—*Ibid.* 215-236. 9 tables. [6 refs.]

III. FAIRBAIRN, H. (1933). **Experimental Infection of Man with a Strain of *Trypanosoma rhodesiense* Apparently Susceptible to Normal Human Serum *in vitro*.**—*Ibid.* 251-264. 2 figs. on 1 plate, 2 tables, 1 graph. [10 refs.]

IV. ADAMS, A. R. D. (1933). **A Record of an Investigation into the Action of Sera on the Trypanosomes Pathogenic to Man.**—*Ibid.* 309-326. 7 tables. [3 refs.]

I. The majority of the strains of *T. rhodesiense*, tested in the first rat passage, were resistant to human sera. This resistance had often disappeared in the second rat passage, but in some cases reappeared at later passages. The resistance of the trypanosomes in serum-trypanosome mixtures should be tested by subinoculation ; instances are recorded of mixtures, in which no trypanosomes were detected, which gave rise to infection on subinoculation, and of mixtures in which trypanosomes were seen, but which failed to cause infection.

II. This article records the infection of buck, wild pig and a serval cat by *Glossina palpalis* and *G. morsitans* cyclically infected with strains of *T. rhodesiense* recently isolated from man. Tsetse were infected readily from the buck and serval cat, but it was found difficult to infect them from wild pig.

III. This article records the experimental infection of the author with a strain of *T. rhodesiense* isolated from man which had been passaged through rats until it had lost its resistance to the author's serum. The serum-resistance had been lost after the ninth passage and trypanosomes from the 19th passage were used for the experimental infection. Four tubes of trypanosome-serum mixtures were made from the same rat passage and, as one of these tubes after 24 hours incubation did infect a rat, the evidence of the loss of serum-resistance is not conclusive.

IV. *T. gambiense* was not susceptible to human sera. *T. rhodesiense* inoculated from man into guinea pigs showed definite serum-fastness which was lost after a variable number of passages in guinea pigs. Two strains of *T. brucei* were found to be susceptible to human serum. No difference appeared to exist between the sera of normal human beings. The sera from a case of sleeping sickness and from a baboon showed very little trypanocidal power, whilst the serum of a sheep with multiple infection was strongly trypanocidal. The sera of four recently infected sheep were also trypanlytic and appeared to be slightly more rapidly fatal to the strain of trypanosome harboured by the individual animal.

—U. F. RICHARDSON.

KRANEVELD, F. C., & DJAENOEDIN, R. (1932). Het voorkomen van het Trypanosoma Theileri Laveran 1902 in Nederlandsch-Indië. **[The Occurrence of *Trypanosoma theileri* Laveran 1902 in the Dutch East Indies].**—*Ned.-Indisch. Blad. Diergeneesk.* **44.** 207-215. 2 tables. [Summaries in English and German : abst. from orig.]

In a study of films and thick smears of blood from 233 water buffaloes and 213 bullocks in Middle and West Java, no cases of *T. theileri* were found. On the other hand, the trypanosome was successfully cultivated in alkaline broth from the blood of 101 buffaloes (43 per cent.) and 83 cows (39 per cent.). It was not found in 20 cows and 13 buffaloes which were seldom or never out at pasture.

—J. VAN DER HOEDEN (UTRECHT).

DISEASES CAUSED BY VIRUSES.

KRÁL, F. (1933). Variabilita a ultrafiltrabilita infekční anemie koni. [**Variability and Ultrafiltrability of the Virus of Infectious Anaemia of Horses**].—*Zverol. Rozpravy.* **7.** 208-215. 2 figs. [3 refs.]

This is a preliminary report upon experiments concerning the nature of the virus of infectious anaemia of horses.

The virulence of the virus varied, as was shown by the length of the incubation period after the injection of infective material ; it also varied according to whether blood, blood serum or filtrate was used. The virulence depends upon the protein content of the injected fluid. After injection of fluid rich in protein the incubation period was very short. Experiments showed that ultrafiltrates through Zigmondy-Bachmann filter membranes were not infective. In the author's opinion the virus is bound to the blood proteins and after ultrafiltration remains attached to the proteins on the membrane, so that the ultrafiltrate is free from the virus.

The urine of horses affected with the disease was only infective when it contained proteins (albuminuria).—E. PRIBYL (BRNO).

I. MARCENAC, & CARNUS. (1933). Les affections typhoïdes à l'Ecole de Saumur. [**Equine Influenza at the Saumur Military Academy**].—*Rev. vét. milit.* **17.** 277-291.

II. BOUCHET, & JOLY. (1933). Considérations sur une épizootie d'affections typhoïdes. [**Notes on an Epizootic of Equine Influenza**].—*Ibid.* 293-297.

III. LAGAILLARDE. (1934). Contribution à l'étude de la grippe équine et de la typhose équine. Epizooties observées au 2e Régiment de Hussards. [**Equine Influenza**].—*Rev. vét. et J. Méd. vét.* **86.** 78-94. 3 tables.

I. The outbreaks of influenza among army animals at Saumur during 1928 and 1932 are compared and the authors conclude that their findings in the later outbreak confirm those arrived at in 1928. They state that, in addition to the classic diseases described by PÖELS and BASSET and that due to a streptococcus, there is a similar disease caused by a bacillus of the paratyphoid B type. They consider that influenza is too wide a term and that the disease with which they were dealing should be called a paratyphoid affection.

They found novarsenobenzol an absolute specific, both as a prophylactic and a therapeutic agent, the dose being 3 g. repeated after an interval of two or three days in severely affected animals. The use of antigangrenous and antistreptococcic sera is also recommended to avoid the onset of gangrenous pneumonia. Sodium salicylate *per os* and the intravenous injection of formol (5 g. in 10 c.c. of water) was also used, but was not considered of much value.

II. Blood cultures were made from 20 cases immediately on admission to hospital. Eighteen remained sterile and two developed contaminations, one with *B. subtilis* and the other with a diphtheroid organism. The authors are of the opinion that organisms of the paratyphoid B and *coli* types, pneumococci and streptococci found in the blood of animals affected with influenza, are secondary invaders.

Treatment consisted of the intravenous injection of camphorated oil (20 c.c. of a 10 per cent. mixture) and tincture of digitalis (20 c.c.). In no case did the injections give rise to any unfortunate sequelae and the intravenous route avoided the usual objections to the use of camphor, namely, the slow rate of absorption and abscess formation.

III. The usual symptoms are described and as regards treatment the author considers novarsenobenzol to be an absolute specific. The dose, given intravenously,

ranged from 1·8 to 3 g. in 10 c.c. of water. The beneficial effects were noticed immediately, the temperature dropped to normal, animals regained their appetites and there was a clearing of the membranes, etc.—C. J. R. LAWRENCE.

HINDMARSH, W. L. (1933). **Some Observations on Immunity to Bovine Contagious Pleuro-Pneumonia.**—*Austral. Vet. J.* **9.** 132-138. 2 tables. [5 refs.]

The chief obstacles encountered in effecting complete control of bovine contagious pleuro-pneumonia is the detection of " carriers " and of mild cases. The value of the complement-fixation test in detecting such animals was investigated. The technique is described and certain difficulties discussed. The results obtained were satisfactory ; of 58 cattle tested the eight positive reactors and three of the four suspicious reactors showed lesions on *post-mortem* examination; in the other suspicious reactor no lesions were found and one of the negative reactors later developed the disease. However, vaccination of in-contact animals is carried out as part of the general control measures and this introduces a complicating factor ; it produced a subsequent positive reaction in three more cattle which showed no lesions when examined *post mortem.*

The effect of vaccination on the complement-fixation test was then investigated at the laboratory. Ten negative reactors to the test were vaccinated in the tail and later three gave positive reactions. During this work it was noted that the local reactions to the usual tail inoculation of " virus " were irregular and often negligible, as also were the reactions to subsequent subcutaneous inoculation of 5 c.c. of " virus." As a result of these latter observations and considering their effect on the complement-fixation test some doubt is expressed as to the reliability of tail inoculation as a preventive measure.—W. I. B. BEVERIDGE.

SEN, K. C., & ROY, A. C. (1933). **Serum-Proteins of Healthy Hill Bulls and their Variations during Rinderpest and after Recovery.**—*Ind. J. Vet. Sci. & Anim. Husb.* **3.** 39-64. 11 tables, 8 charts. [32 refs.]

The ratios between different serum protein fractions (albumin, globulin, euglobulin and pseudoglobulin) of 28 healthy hill bulls and a number of animals suffering from rinderpest have been determined by a modification of Wu's colorimetric method. No evidence was obtained in support of the view that immunological behaviour is associated with these protein ratios. When the disease proved fatal it was always associated with a decrease in the absolute amount of protein [as previously reported by HARTLEY (1914). *Mem. Dep. Agric. India. Vet. Ser.* **1.** 205]. After recovery there was a fluctuation of the different protein fractions for a time, possibly due to environmental effects or to a long period of under nutrition during a serious disease.—W. R. WOOLDRIDGE.

I. LIGNIÈRES, J. (1933). Sur la Vaccination antiaphteuse. **[Vaccination against Foot and Mouth Disease].**—*Bull. Acad. vét. France.* **6.** 123-124.

II. LIGNIÈRES, J. (1933). L'action du froid sur la vaccination anti-aphteuse par l'injection simultanée, en des points rapprochés, du virus et de petites quantités de sérum spécifique. **[The Action of Cold upon Foot and Mouth Disease. Vaccination by Simultaneous Injection, at Adjacent Points, of Virus and Specific Serum].**—*C. R. Soc. Biol. Paris.* **113.** 127-129. [1 ref.]

III. LIGNIÈRES, J. (1933). Investigaciones experimentales sobre la duración de la inmunidad después de la vacunación contra la fiebre aftosa. **[Duration of Immunity after Foot and Mouth Disease Vaccination].**—*Rev. Zootéc. Buenos Aires.* **20.** 87-90. [1 ref.]

IV. LIGNIÈRES, J. (1933). La acción del frio en la vacunación antiaftosa per inoculación simultánea, en sitios aproximados, de virus y pequeñas cantidades de suero especifico. [**The Action of Cold upon Foot and Mouth Disease Vaccination by the Simultaneous Inoculation, at Adjacent Sites, of Virus and a Small Quantity of Specific Serum**].—*Ibid.* 93-96. [1 ref.]

I. In the first part the author states that 24 guinea pigs vaccinated against foot and mouth disease withstood infection with polyvalent virus nine months later. In the second part he suggests that a low external temperature, by interfering with cutaneous circulation, may account for accidents in foot and mouth disease vaccination by intradermal inoculation. He states that guinea pigs, exposed to a low temperature during 24 to 48 hours following vaccination succumbed to the disease on being brought back to laboratory temperature.

II. A more detailed account of the experiments upon guinea pigs referred to in the second part of I is given. The results are based on experiments upon groups of two or three guinea pigs.

III. This is a full account of the experiment referred to in the first part of I.

IV. This is a further account of the experiment mentioned in the second part of I.—R. S. ROBERTS.

I. GALEA, M. (1932). Sur la conservation de la valeur antigène *in vivo* du virus aphteux inactivé par le chloroforme. [**The Conservation of the Antigenic Value *in vivo* of Foot and Mouth Disease Virus inactivated by Chloroform**].—*C. R. Soc. Biol. Paris.* **111.** 302-304. [2 refs.]

II. GALEA, M. (1932). Sur la durée de la phase négative au cours de l'immunisation anti-aphteuse active du Cobaye par un vaccin chloroformé. [**The Duration of the Negative Phase in Foot and Mouth Disease Active Immunization of Guinea Pigs by a Vaccine Treated with Chloroform**].—*Ibid.* 375-377. [1 ref.]

III. GALEA, M. (1932). Recherches sur la durée de l'immunité anti-aphteuse active conféré au Cobaye par le vaccin chloroformé. [**Experiments on the Duration of the Activity of Foot and Mouth Disease Immunity Conferred on the Guinea Pig by Chloroform-Treated Vaccine**].—*Ibid.* 566-567. [2 refs.]

IV. GALEA, M. (1932). Sur une nouvelle technique rapide et sure de vaccination active du Cobaye contre la fièvre aphteuse. [**A New Method of Rapid and Reliable Vaccination of Guinea Pigs against Foot and Mouth Disease**].—*Ibid.* 781-783. [3 refs.]

I. The immunizing properties of chloroform-treated vaccine remain unimpaired for 142 days at least when stored at -8° to -10°C. When stored and exposed to light in the laboratory at 16° to 18°C. the vaccine loses its value in 27 days. The author considers that this is due to the change in pH.

II. The guinea pigs were vaccinated by an intradermal inoculation of 1 c.c. of vaccine treated with chloroform. Subsequently, after varying periods, they were inoculated subcutaneously or intradermally with virus. Employing a 5,000 to 10,000 minimal infecting dose intradermally 72 hours after vaccination, and a 100,000 minimal infecting dose intradermally five days after vaccination, it was shown that the guinea pigs had some degree of immunity. Small local lesions were seen in the case of the animals tested intradermally, but these lesions were small and disappeared on the third day.

III. Experiments were carried out to test the value of foot and mouth disease virus inactivated by chloroform. It is not stated how the vaccine was prepared. Virulent virus was used throughout the experiments for control purposes. The

vaccinated animals were tested at varying periods. The longest period of trial was with guinea pigs that had been vaccinated 172 days. Nine out of ten resisted 500 minimal infecting doses inoculated intradermally into the pad. The remaining one showed lesions at the same time as the ten controls. A group of six vaccinated guinea pigs all resisted the subcutaneous inoculation of 1,000 minimal infecting doses. The six controls all showed generalized lesions. The immunized guinea pigs tested by the intradermal route showed, in the majority of cases, a local reaction which disappeared within two to three days.

From these experiments the author concludes that the " partial " active immunity produced by the inoculation of 1 c.c. of the chloroform-treated virus is efficient at least over the period stated. Virus " O " Vallée-Carré was used throughout the experiments.

IV. Two inoculations are given with an interval of five days. The first consists of the chloroform-treated vaccine injected intradermally at several points in the form of a circle. Four days later a single inoculation of normal virus is given intradermally in the centre of the circular area. Immunity is produced in six days and is stated to be quite solid.

Specific lesions of foot and mouth disease are not seen in the course of this immunization and the blood of the vaccinated animal is incapable of infecting other guinea pigs.—NORMAN DOBSON.

I. KINSLEY, A. T. (1933). **A Century of Hog Cholera.**—*J. Amer. Vet. Med. Ass.* **83.** 449-463.

II. VARENNE, H., & MARCHAND, E. (1933). Notes sur la peste porcine. Emploi des vaccins à titre préventif. **[Some Observations on Swine Fever and on the Use of Immune Serum].**—*Rev. gén. Méd. vét.* **42.** 416-420.

I. The author surveys the history of hog cholera [swine fever] in the United States from its first recognition in 1833 down to the present time. To illustrate its economic importance for the pig industry it is sufficient to mention that the estimated annual financial loss from the disease is at least 20 million dollars. There were approximately 54 million pigs in the U.S.A. in January, 1932. Although the serum-virus method of immunization against swine fever is highly efficient and five times as many pigs were inoculated in 1932 as in 1915, the annual loss from the disease, except in 1926 when there was a widespread epidemic, was practically the same. Kinsley concludes, therefore, that there is something fundamentally wrong with the existing system of control. He mentions, however, that probably not more than 30 per cent. of all pigs are vaccinated in any year and this apparently is the main cause of the continued heavy loss. He believes that if all pigs were vaccinated—and this is no more impracticable than to apply the tuberculin test to all cattle—over a period of five to ten successive years, the disease would be eradicated.

He discusses quarantine regulations, movements of diseased pigs, community pig clinics, efficient veterinary service, restriction on the distribution and use of virus, and vaccination by laymen.

It is of interest to note that Kinsley does not believe that the existence of permanent carriers of the virus has been proved.

" The importance of pork scraps and garbage as a source of hog cholera infection has been demonstrated definitely in Maryland where, for the five-year period from 1925 to 1931 inclusive, of 2,677 outbreaks, 2,245 (approximately 84 per cent.) were due to pork scraps and garbage."

He refers to the danger of slaughtering pigs on farms and the local sale of the dressed pork. " Some of these slaughtered hogs, either from the farm or public

market, may have been in the incubation stage of cholera when they were slaughtered and the pork scraps from them may carry the infection."

He discusses the control of the disease by (1) vaccination, (2) quarantine, slaughter and disinfection and (3) vaccination, quarantine and disinfection. [This paper should be read in the original by those interested in the subject].

II. The authors describe an outbreak of disease among young pigs about three months old. A diagnosis of swine fever was made on the symptoms exhibited and the lesions found on autopsy. The principal lesions were intestinal ulceration, pneumonia and petechiae in the kidneys.

The apparently healthy and also the slightly affected pigs were given swine fever serum with apparently good results.

It is to be noted that the adult pigs—about 100 sows—on the premises did not contract the infection.—T. M. Doyle.

I. Geiger, W. (1933). Die Haltbarkeit des Virus der Schweinepest in Dünger und Jauche. [**Viability of Swine Fever Virus in Manure**].—*Deuts. tierärztl. Wschr.* **41.** 625-631. [11 refs.]

II. Ludovic, & Blaizot, P. (1933). Longévité du virus de la peste porcine en milieu glycériné. [**Longevity of the Swine Fever Virus in Glycerinated Medium**].—*C. R. Soc. Biol. Paris.* **114.** 898-899. [1 ref.]

III. Powley, J. O. (1933). **Swine Fever and Enteritis in Young Pigs.**—*Vet. Rec.* **13.** 1314-1329. [9 refs.] [Paper read at Ann. Congress, Nat. Vet. Med. Ass., held at Llandudno, September, 1933].

IV. Krüger, H. (1933). Untersuchungen zur experimentellen Feststellung der Schweinepest. I. Paragglutination. II. Uebertragungsversuche auf Meerschweinchen. [**Diagnosis of Swine Fever. I. Paragglutination. II. Guinea Pig Passage**].—*Zschr. Infektkr. Haust.* **45.** 210-223. [21 refs.]

I. Virus-infected material was stored in dung under various conditions. The virus survived two to four days, depending upon the amount of heat generated within the dung. Virus could not be demonstrated in manure water collected from sties containing infected pigs. In artificially contaminated manure water, virus survived from two to seven weeks. There was no opportunity for estimating the full extent to which the pH can influence the survival of virus.

II. Suspensions containing 10 g. of swine fever infected tissue pulp, 10 c.c. of saline and 10 c.c. of glycerine were stored for more than five years without the virus losing its infectivity.

III. The *peracute* type of swine fever runs a very rapid course, terminated by sudden death. *Post-mortem* changes consist of slight hyperaemia of the intestinal tract. The *acute* type shows a high temperature, inappetence, vomiting, thirst, loss of power in the loins and hindquarters, foetid odour, rigors and uneasiness. The animal looks miserable and has a sticky catarrhal discharge from the eyes and nose. At the onset there is constipation or diarrhoea, later a foetid diarrhoea. A short husky cough is generally present. *Post mortem* there are petechial haemorrhages in the skin, alimentary tract, lungs and kidneys. The large intestine shows a serofibrinous infiltration between the mucosa and submucosa ; ulcers or diphtheritic deposits may be present. Marked congestion of the bowel is common. The mesenteric lymphatic glands are large and strawberry-like. The *chronic* type is unaccompanied by symptoms other than those of general unthriftiness, and intermittent diarrhoea. Necrotic enteritis is found in varying degrees *post mortem.*

Infectious necrotic enteritis is probably caused by *Bact. suipestifer*, *Fusiformis necrophorus* acting as a secondary invader. This disease is associated almost

exclusively with bad housing or hygiene, or any debilitating factor. Outbreaks of diarrhoea accompanied by necrosis of the bowel wall if confined to young pigs may be differentiated from swine fever by the history. A history of abortions, " sway-backed " sows, etc., is evidence of swine fever. In infectious necrotic enteritis lesions are mostly in the colon and ulcers have a characteristic blackened edge when healing. Other differentiating factors are a low mortality and morbidity, and immunity of old pigs.

Swine dysentery is an acute haemorrhagic enteritis which occurs in America. The lesions consist of a haemorrhagic catarrh replaced later by diphtheritic plaques.

Poisoning. Sulphur, caustic soda, and salt poisoning result in acute enteritis.

Coccidiosis has not been described in Great Britain. Infestation is accompanied by unthriftiness and a low-grade enteritis.

Tuberculous enteritis is rare. It is accompanied by a cough, wasting and a chronic diarrhoea. The lesions at autopsy are characteristic.

In discussing the differential diagnosis the author pointed out that swine fever is characterized by the formation of clear cut petechial haemorrhages in the submucosa of the alimentary tract. These petechiae do not diffuse or disappear readily even after death. Ulcerative lesions are due to secondary invaders such as *Bact. suipestifer* and *Fusiformis fusiformis*. At present, diagnosis of swine fever must rest upon clinical opinion formed from a detailed analysis of the history, symptoms, lesions and progress of infection. Typical cases are easily recognized, but difficulties arise when only diphtheresis and ulceration are found.

Opening the discussion, BECKETT suggested that numerous alleged outbreaks of swine fever were really infectious necrotic enteritis. Data were presented, collected during such outbreaks, which showed a high seasonal mortality in the winter amongst young pigs, whereas amongst the adults mortality was normal and uniformly distributed throughout the year. The use of swine fever antiserum was without value. The foregoing factors ruled out the possibility of swine fever. The symptoms in these outbreaks of infectious necrotic enteritis included inappetence, listlessness, pallor of the skin, a profuse and foetid diarrhoea and, in chronic cases, marked anaemia. At autopsy effusions in the pericardium, pleura and peritoneum were common ; the alimentary tract showed gastritis and a haemorrhagic or necrotic enteritis ; the mesenteric lymphatic glands were enlarged and oedematous and the kidneys showed petechial haemorrhages.

IV. The Weil-Felix reaction [i.e. the agglutination of certain strains of *Proteus vulgaris* by the blood of human beings suffering from typhus fever] was not helpful when applied for the diagnosis of swine fever, though *Proteus vulgaris* X-19 was isolated from the tissues of a few pigs suffering from this disease. Inoculation of swine fever-contaminated material into guinea pigs produced temperature reactions, but no characteristic train of symptoms.—E. J. PULLINGER.

LIGNIÈRES, J. (1933). Méthode de vaccination contre la fièvre aphteuse appliquée à la peste porcine. [**Method of Foot and Mouth Disease Vaccination applied to Swine Fever**].—*C. R. Soc. Biol. Paris.* **113.** 253-255.

One pig was successfully vaccinated against swine fever by simultaneous inoculations, at the same point, of immune serum (2 c.c. intradermally and 2 c.c. subcutaneously) and virus attenuated with phenol.—R. S. ROBERTS.

ADSERSEN, V. (1933). Bemaerkninger om Svinepest. [**A Note on Swine Fever**]. —*Med. dansk. Dyrl.* **16.** 245-259. [9 refs.]

Post-mortem examination of a number of pigs which had died of swine fever

may show lesions that are not caused by the disease, whilst other cases in which swine fever is not present may show lesions resembling those of the disease.

In Denmark the best result is obtained by a centralization of the laboratory diagnosis. The practitioner may facilitate the diagnosis of the case by forwarding detailed information together with suitable material. With the laboratory as an intermediate link the Veterinary Department can take up the investigations as early as possible in order to secure an accurate diagnosis.

There has been too much tendency to emphasize that swine fever is a disease of young pigs.—H. LORENZEN (SONDERBORG).

NEITZ, W. O., & THOMAS, A. D. (1933). **Rabies in South Africa. Occurrence and Distribution of Cases during 1932.**—*Onderstepoort J. Vet. Sci. & Anim. Indust.* **1.** 51-56. 2 tables, 1 map. [3 refs.]

THEILER, A. (1934). **Rabies in South Africa.**—*Vet. J.* **90.** 9-13. [5 refs.]

Both these articles stress the peculiarity of South African rabies, that it mainly occurs in wild carnivora (Viverridae) and that the dog is not the main factor in its persistence or spread. The principal carrier appears to be the mongoose, but the genet cat and species of meercat act as virus reservoirs.

Eighteen cases were diagnosed in 1933 in human beings, domestic animals and wild carnivora. This is an increase on cases reported in previous years, but it is doubtful whether it represents an actual spread or purely an increased efficiency in diagnosis. Records of the distribution of outbreaks reveal considerable free areas, but this may be due to failure of detection as the disease is often not apparent unless human beings or domestic animals become infected.

The second paper records that biological and histopathological investigations indicate that the disease is identical with the rabies of Europe, but that the cross-testing of immunity has not been completed. Some interesting notes on the history of rabies in South Africa are also given in this paper.

—U. F. RICHARDSON.

MIGONE, L. E., & PENA, R. (1933). El mal de caderas de los bovinos del Paraguay. [**Mal de Caderas (Non-Trypanosome) of Bovines in Paraguay**].—*Rev. zootéc. Buenos Aires.* **20.** 37-41.

Various attempts have been made to elucidate the aetiology of the South American disease known as bovine "mal de caderas." For some time it was believed to be septicaemia haemorrhagica, but since 1910 several authors have come to the conclusion that it is rabies. In 1931, it was described as pseudo-bulbar paralysis (Aujeszky's disease), but up to the present there is a considerable weight of evidence in favour of the view that it is due to a virus which only differs from the true rabies virus in its degree of virulence.

The disease has been reported from Argentine and Brazilian states close to the Paraguayan frontier and in the present paper the author describes the disease in Paraguay.

In the early stages of an outbreak mortality is low, and 20 months may pass before a peak is reached. If an infected herd is moved into a clean area cases continue to appear for two and a half months, but infection does not spread to indigenous bovines. Dogs in an infected district may show typical rabies or the "mal de caderas" form.

Mortality is said to be from 95 to 98 per cent., but this includes mortality or recovery from other diseases.

Although primarily affecting bovines, the disease also occurs in all other domestic animals. In horses the disease is distinguishable from mal de caderas due to trypanosomes by examination of blood smears.

Negri bodies are not invariably found *post mortem*.—R. S. ROBERTS.

CAUCHEMEZ, L. (1933). La lutte contre "la maladie du chancre du mouton" par l'inoculation préventive. [**Vaccination against Contagious Ecthyma of the Sheep**].—*Bull. Acad. vét. France.* **6.** 435-438.

The author has adopted Aynaud's method of protecting sheep against contagious ecthyma. The vaccine is prepared by treating the dried scabs with chloroform for six to eight hours and then suspending in pure glycerine to make a 1 per cent. dilution. It is stated that 6,639 sheep have been vaccinated without untoward effects.—R. E. GLOVER.

GLOVER, R. E. (1933). **Contagious Pustular Dermatitis. (A) Cross-Immunity Experiments with Various Strains. (B) Serological Tests.**—*Third Rep. Direct. Inst. Anim. Path. Univ. Cambridge. 1932-1933.* 1-13. 6 tables. [11 refs.]

A number of strains of viruses from outbreaks of ovine dermatitis were examined by cross-immunity experiments and were found to conform to a single type. Two caprine strains from Tanganyika and Cyprus respectively induced mild reactions in sheep. The former appeared to be identical with the English sheep virus, but the evidence regarding the latter was inconclusive.

The presence of complement-fixing antibodies in the sera of hyperimmunized lambs was demonstrated by the use of antigen obtained by maceration of the infected crusts at 37°C. The reaction was specific since no fixation occurred with normal lamb skin or with a staphylococcal suspension. Fixation also occurred with sera from naturally infected lambs immediately after recovery, but the reaction rapidly faded in the course of a few weeks. The reaction with hyperimmune serum was of value in the detection of the virus in suspected crusts. Hyperimmune serum contained protective antibodies which neutralized the virus *in vitro*.

—R. E. GLOVER.

GORDON, H. McL. (1933). **On the Presence of a Rickettsia-Like Organism in the Lymphocytes of Sheep.**—*Austral. J. Exp. Biol. & Med. Sci.* **11.** 95-97. 3 figs. [9 refs.]

Rickettsia-like bodies were regularly observed by the author in smears made from the blood of sheep carrying *Melophagus ovinus*. As many as 82 per cent. of the lymphyocytes contained from one to 20 of these bodies. Ring and half-ring forms were common and bipolar staining forms have been observed. Others occurred as small coccus-like bodies, or large crowded masses which did not stain uniformly. The suggestion that the bodies described are *Rickettsia melophagi* is based upon their resemblance, both in morphology and arrangement, to the other *Rickettsia* spp. of sheep, and on the fact that they were not present in new-born lambs which were free from *M. ovinus*, but appeared a fortnight later when these lambs became infested with this parasite.—H. McL. GORDON.

I. FUKUSHIMA, T., & SHIMOMURA, K. (1933). Beiträge zur pathologisch-anatomischen Kenntnis der *Farinasschen Avianpest*, insbesondere zur Vergleichung mit solchen wie der in Korea auftretenden Hühnerseuche. [**Fowl Plague described by Farinas, compared with a Similar Disease in Korea**]. —*J. Jap. Soc. Vet. Sci.* **12.** 1-7. 2 figs., 1 table. [5 refs.] [Orig. in German].

II. NAKAMURA, J., OYAMA, S., FUKUSHO, K., & TOMONAGA, N. (1933). Vergleichende immunbiologische Untersuchungen des Korea-hühnerseuchenvirus und des Japanischen Geflügelpestvirus. Zugleich über die Beziehung zum Virus der Newcastle Disease. [**Cross-Immunity Test with Korea**

Fowl Disease and Japanese Fowl Plague and a Comparison with Newcastle Disease].—*Ibid.* 135-146. 5 tables. [9 refs.] [Orig. in German].

III. FUKUSHIMA, T. (1933). Zur Kenntnis der Hühnerpestpathologie. (Zugleich ein Aufschluss über die in Korea auftretenden Hühnerseuchen). [**Pathology of Fowl Plague**].—*Ibid.* 147-164. 9 figs. on 5 plates, 5 tables. [18 refs.] [Orig. in German].

I. The authors describe the macroscopic and microscopic findings, following the artificial infection of six fowls with a Philippine strain of fowl plague (Newcastle disease). They found no outstanding differences between this infection and the virus disease of fowls commonly occurring in Korea. No immunological comparisons were made.

II. Monovalent hyperimmune sera were prepared against the Sato and Philippine strains of fowl plague virus (these again are the viruses of Newcastle disease) and also against the Chiba and Korea viruses of fowl disease. *In vitro* the Sato, Philippine and Korea viruses and antisera gave cross-neutralization and *in vivo* they produced both active and passive cross-immunity. The Chiba virus gave no cross-neutralization and no cross-immunity with the other virus strains.

III. The author has compared the pathological findings following the artificial infection of fowls with various strains of fowl plague virus. The histological findings, which varied with virus strains, are unsuitable for abstraction. Briefly, the spleen sometimes showed hyperplasia of the reticulo-endothelial system, hyperhaemosiderosis and degenerative changes whilst the central nervous system showed a lymphoid infiltration of the adventitia of the blood vessels. The exact nature of the change depended upon the degree of neurotropism or organotropism of the virus, but changes in the central nervous system always occurred. The author considers that the strain of virus found in Korea may be considered as true fowl plague.—E. J. PULLINGER.

I. SEIDENBERG, S. (1933). Ueber die unspezifische Immunität der weissen Ratte gegen das Virus der Hühnerpest. [**The Non-Specific Immunity of White Rats to Fowl Plague Virus**].—*Zschr. Hyg.* **114.** 754-755. 1 table. [2 refs.]

II. ELFORD, W. J., & TODD, C. (1933). **The Size of the Virus of Fowl Plague Estimated by the Method of Ultra-Filtration Analysis.**—*Brit. J. Exp. Path.* **14.** 240-246. 5 tables. [8 refs.]

III. HALLAVER, C. (1933). Ueber Zuchtungsversuche von Hühnerpestvirus in zellfreien Medien. [**Cultivation of Fowl Plague Virus in Cell-Free Media**].—*Zschr. Hyg.* **115.** 616-622. 3 tables. [20 refs.]

I. The author failed to confirm the findings of COLLIER [(1932). *Zschr. Hyg.* **113.** 758.] that white rats inoculated intratesticularly or intracerebrally with Rous sarcoma virus acquire an immunity to an additional infection of fowl plague virus.

II. The authors have concluded, on the basis of filtration experiments through collodion membranes [ELFORD (1931). *J. Path. & Bact.* **34.** 505.], that the size of the virus particles, as they exist in the body fluids of the fowl, lies between 60 and 90 $m\mu$. Staphylococcus K bacteriophage [size 50 to 75 $m\mu$] was used as control. Measurements of the potency of the virus filtrate were made by the inoculation of serial dilutions of the filtrate into susceptible cockerels.

III. The author was unable to demonstrate the multiplication of fowl plague virus in Maitland's medium [MAITLAND & LAING (1930). *Brit. J. Exp. Path.* **11.** 119.]; but the virus survived a considerable time in this medium and degeneration occurred slowly. In living and actively multiplying brain tissue culture, multiplication of the virus occurred, but when degeneration commenced in such a medium it proceeded very rapidly.—E. J. PULLINGER.

I. GIBBS, C. S. (1933). **The Desiccation and Preservation of Infectious Laryngotracheitis Virus.**—*J. Bact.* **25.** 245-251. 1 fig., 1 table. [6 refs.]

II. GIBBS, C. S. (1933). **The Immunology of Infectious Laryngotracheitis.**—*Massachusetts Agric. Expt. Sta. Bull.* No. 295. pp. 20. 4 figs., 13 tables. [23 refs.]

I. Gibbs preserved laryngotracheitis virus for over a year by rapidly drying it in a desiccator over one of the common dehydrating agents and keeping the desiccator at just above freezing-point.

II. The author records the results of experiments carried out with the object of finding a suitable method for the immunization of fowls against laryngotracheitis.

The inoculation of the virus into the bursa of Fabricius was found to give good results. It is claimed that inoculation by this route gives a higher percentage of " takes " and a longer immunity than when the virus is inoculated into the cloaca. [The bursa of Fabricius is a bulb-like organ on the dorsal wall of the cloaca. It reaches its maximum development about the fourth to fifth month and then gradually retrogresses. Its function is unknown].—T. M. DOYLE.

KODAMA, T. (1933). **Investigation concerning the Methods of Mitigating Filtrable Viruses by Precipitation for the Purpose of Preventive Immunization. (Report II). Further Studies on the Properties of Vaccine Virus Precipitated with Aluminium or Ferric Salts.**—*Kitasato Arch. Exp. Med.* **10.** 308-319. [29 refs.] [Copied *verbatim* from *Bull. Hyg.* **9.** 242. Signed by O. K. WRIGHT].

A somewhat technical account of experiments indicated in the title and a brief discussion of the bearing of certain points in their application to the possible use of inactivated vaccine virus for producing immunity. Virus inactivated by adsorption by Al. and Fe. salts can be liberated by contact with plasma or serum, and the presence of tissue fluids can inhibit the adsorption. Hence it is necessary to use virus as free from tissue fluids as possible to obtain complete adsorption and the use of virus purified by kaolin adsorption for inactivation by Al. or Fe. salts gives the best results. As toxic effects may be produced by the injection of a large amount of Al. or Fe. with the virus it is an advantage to keep the content of these salts as low as possible, and the author shows that his method of Al. precipitation, which has been described elsewhere, gives a compound containing 1/15 the quantity of Al. contained in the compound obtained by Willsttäter's method. Vaccine virus adsorbed by Al. or Fe. remains viable in the ice chest for more than four weeks and Al. salts are relatively less toxic for the virus than Fe. salts.

INVERTEBRATE VECTORS OF DISEASE.

JACKSON, C. H. N. (1933). **On an Advance of Tsetse-Fly in Central Tanganyika.**—*Trans. Roy. Entomol. Soc., London.* **81.** Part. 2. 205-221. 1 map. [Copied *verbatim* from *Rev. Appl. Entomol.* **22.** 55].

The following is taken largely from the author's summary : An advance of tsetse-flies (*Glossina morsitans*, Westw.) has taken place within the present century in Kondoa, Mbulu and Singida Districts of the Central Province of Tanganyika Territory, to a maximum depth of about 50 miles from its origin in northern Kondoa. The situation, character, climate, vegetation, fauna and population of the country are described. Sleeping sickness does not yet occur in the area, the prevalent trypanosome being *Trypanosoma congolense*. The history of the advance,

as reconstructed from various sources, makes it clear that the present grave state of affairs is not due to a mere increase in density of an indigenous tsetse population. Factors influencing the rate of the advance are discussed. Wet years in a dry country, such as that under consideration, may favour the increase of fly. The existence of suitable *Berlinia-Brachystegia* woodland implies that the advance will continue more or less rapidly. Dense, continuous thicket is an absolute barrier where it occurs in sufficient width. Certain types of thorn woodland, if extensive, delay advance and may arrest it. The movements of animals and the presence of motor roads do not appear to affect the advance as long as it is continuing through suitable country. Near large settlements the apparent density of fly is lower, and dense continuous settlement acts as a barrier. It would appear, but is not proved, that flies when still in small numbers tend to keep to the drainage valleys, which under other conditions are used purely as feeding grounds. It is suggested that they may do this owing to some social instinct. The progress of the advance is thought to depend mainly on the increase of population of tsetse, not because of any congestion, but because a larger fly population will provide a larger number of individuals wandering ahead of their own accord. It was not determined whether the most advanced flies have any tendency to return to the main body. The advance is likely to continue southwards and westwards, and to join in the west with two other advances approaching from different directions. The cattle of several native tribes are likely to suffer heavy losses or perhaps to be exterminated.

DISEASES CAUSED BY METAZOAN PARASITES.

I. Sinclair, W. M. (1933). **The Blow Fly Problem.**—*Med. J. Australia.* Sept. 2nd. 308-311.

II. —. (1933). **Tick and Blowfly Problems.—Suggested Use of the Cattle Egret Bird** (*Babulcus Coromandus*).—*J. Sci. & Indust. Res. Australia.* **6.** 213.

III. —. (1933). **A Sheep Blow-Fly Trap.**—*J. Dept. Agric. Victoria.* **31.** 213. 2 figs.

I. The paper deals with information collected in South Australia in 1918-1921. The succession of blowfly larvae in sheep carcasses is discussed and it is considered that only two important species occur in the sheep-growing areas of Australia, both being *Chrysomyia* [*Cochliomyia*] spp. The incidence of other larvae is of negligible importance in the presence of *Chrysomyia* spp., which drive out or eat the others.

Blowfly larvae are unable to develop in the absence of putrefactive bacteria. Such bacteria are of little importance except in the presence of moisture. Excess moisture occurs in the fleece of the sheep owing to hyperactivity of the cutaneous glands or to high atmospheric humidity. It is considered that greater glandular secretion occurs normally in the case of mutton sheep, which have a larger number of yolk and sweat glands than the Merinos. In true mutton sheep this is compensated by the less dense and shorter fleece. Where mutton sheep are crossed with Merinos the hybrid may have the Merino fleece and the more numerous cutaneous glands of the mutton sheep. Such sheep are susceptible to fly strike under any conditions. A fly-blown sheep is an indication of reversion from a woolly to a hairy mutton type. It is considered impossible to eradicate the fly in Australia owing to the provision of a constant supply of carrion resulting from the large rabbit population. The pastoralist should aim at controlling fly strike by correctly breeding the sheep and maintaining them under suitable conditions which are not

conducive to a growth of putrefactive bacteria. The fly should serve as an indicator of the sheep to be culled and any ram throwing a proportion of sheep liable to be fly-struck should be eliminated.

II. It had been thought that perhaps the cattle egret might be of some value if imported into Australia as a means of controlling the cattle tick and perhaps the blowfly and buffalo fly pests. Local authorities were averse to the introduction of the birds, but sought information from the Imperial Council of Agricultural Research in India. The Council stated that, though the egrets certainly consumed large numbers of ticks, they were quite ineffective in keeping the pest under control in India. Observations did not indicate that these birds had in any way obviated the necessity for artificial methods, such as dipping, if ticks were ever to be brought under satisfactory control, and it seemed very unlikely that the egret would have any marked effect upon tick or fly infestation in Australia, particularly in the drier areas.

III. Describes a simple fly trap consisting of a tin receptacle containing scraps of meat covered with a solution of arsenic (1 lb. per 100 gallons). An extra attraction for the flies is provided by the attachment of a gauze covered tin containing liver in water.—H. McL. Gordon.

Mackerras, M. J. (1933). **Note on the Occurrence of a White-Eyed Mutant Race of *Lucilia cuprina* Wied.**—*Austral. J. Exp. Biol. & Med. Sci.* **11.** 45-47. [2 refs.]

White-eyed mutants occurred amongst a number of laboratory reared *Lucilia cuprina* which were probably the descendants of individuals derived from a single oviposition. The mutation appeared in the progeny of the original stock eight months after it had been under observation. White-eyed individuals when segregated produced only white-eyed progeny which bred true for this characteristic for three generations. White-eyed flies also had colourless Malpighian tubes, whereas those of normal red-eyed flies were yellow. The white-eye characteristic was inherited as an ordinary Mendelian recessive and there was no evidence that the factor for eye colour was sex-linked.—I. Clunies Ross.

I. Handschin, E. (1933). Die Rolle von Temperatur und Feuchtigkeit im Auftreten und in der Verbreitung von Lyperosia exigua de Meij. [**Role of Temperature and Humidity on the Incidence of *Lyperosia exigua***].—*Ned.-Indisch. Blad. Diergeneesk.* **45.** 217-227. 1 fig., 6 tables. [15 refs.] [Orig. in German].

II. Nieschulz, O. (1933). Over de reactie van stomoxys op vershillende temperaturen. [**Reaction of Stomoxys to Varying Temperatures**].—*Ibid.* 231-238. 1 fig. [2 refs.] [Summaries in English and German : abst. from orig.]

I. The life cycle of *L. exigua* is completed in 10 or 12 days at a temperature of 28° to 32°C. These flies are only found where the temperature is suitable, but humidity has an important influence upon their ability to increase.

II. Nieschulz made about 3,000 observations on 250 specimens of *S. calcitrans* and found that the average optimum temperature for females was 27·7°C. and for males 28·8°C. Humidity is of no great significance as regards the occurrence of the fly.

S. calcitrans is not well suited to Europe as the temperature is usually too low.
—A. Klarenbeek (Utrecht).

JELEN, G. D. (1933). **Studies of the Nematode, Oesophagostomum Radiatum.**—*Vet. Alumni Quart. Ohio Univ.* **21.** 89-97. 4 tables. [8 refs.]

The observations were made at an abattoir at Columbus, Ohio. The viscera were carefully palpated and afterwards viewed against a strong light. The percentage infected out of 1,136 animals from Ohio was 89 per cent. Cows were highest at 99·4 per cent. and steers lowest at 78·3 per cent. The percentage infected seemed to be in direct proportion to the time spent at pasture.

The prevalence of infection in Ohio cattle was higher than that of other states, but those from other states did not include cows. September and March showed the highest percentage, probably for the same reason.

Aged animals had a higher percentage of extensive infection, but the reverse is true for slight infection.

The monetary loss is calculated at $62,405.10.—G. SLAVIN.

I. KRIJGSMAN, B. J. (1933). De in zoogdieren en vogels parasiteerende wormen van Nederlandsch-Indië. [**Parasitic Worms of Mammals and Birds in Dutch East Indies**].—*Ned.-Indisch. Blad. Diergeneesk.* **45.** 366-379. [Summaries in English and German : abst. from orig.]

II. BAUDET, E. A. R. F. (1933). Aelurostrongylus abstrusus, de longworm van de kat. [*Aelurostrongylus abstrusus*, **the Lungworm of the Cat**].—*Tijdschr. Diergeneesk.* **60.** 982-985. 3 figs., 1 plate. [Summaries in English, French and German : abst. from orig.]

I. A complete review is given of the parasitic worms in mammals and birds in the Dutch East Indies, where the author also made use of the list of cestodes, trematodes and nematodes, published by SMIT [(1926). *Ned.-Indisch. Blad. Diergeneesk.* **38.** 283].

II. Lungworms of the cat are not often seen, and the clinical symptoms are seldom shown. Baudet describes a case of lungworm infestation, in which many larvae were excreted with the faeces. The cysts are found in mice. The diagnosis is based on the structure of the posterior extremity of the larva.

—A. KLARENBEEK (UTRECHT).

TAYLOR, E. L. (1933). *Davainea proglottina* **and Disease in Fowls. The Pathogenicity of the Common Poultry Parasites : an Unknown Factor in the Causation of Disease.** pp. 7. 1 table, 2 graphs. [2 refs.] [Paper read at the World's Poultry Congress, Rome, 6th to 15th Sept. 1933]. [Reprinted in *Vet. J.* **89.** 500-504. 1 table. [2 refs.]

The author enlarges on a theme which he has previously discussed [this *Bull.* **2.** 296.] and emphasizes the fundamental importance, for the understanding of helminthiasis in poultry, of experimentally determining the pathogenicity of the several most widely distributed poultry parasites. A report is given of a series of observations on the pathogenicity of *D. proglottina* in which infected slugs and snails were given to nine fowls in varying doses, three fowls being kept as controls. The weights of the fowls were taken every week throughout the 12 weeks of the experimental period, but they did not show any marked differences, although the infestations as observed at autopsy ranged up to 3,900 tapeworms per fowl (scolices only being counted). It is concluded that 3,000 to 4,000 *D. proglottina* in 12-week-old chickens are not in themselves sufficient to cause any noticeable disturbance of health.

[Owing to a printer's error the headings to the table were omitted from the reprint of this article which appeared in the *Vet. J.* which renders the data unintelligible].—E. L. TAYLOR.

Ross, I. Clunies, & Gordon, H. McL. (1933). **Nutritional Factors Affecting Resistance to Haemonchosis.**—*Austral. Vet. J.* **9.** 100-107. 2 graphs. [8 refs.]

Five sheep, three being lambs and two aged sheep, were exposed to infestation with *Haemonchus contortus* while on a good diet. Two lambs proved susceptible to heavy infestation and one succumbed, while one lamb and both aged sheep proved highly refractory. Five months after the first injection the previously susceptible lamb was retained on normal diet and the two aged sheep and the previously insusceptible lamb were placed on a diet of equal parts of Kellogg's corn flakes and wheaten straw chaff, low in minerals (Ca, 0·0625 per cent.; P, 0·079 per cent.; protein, 5·1 per cent.). After 50 days on this diet all three sheep were still resistant to infestation and more so than the lamb on normal diet. After a total period of five months on this ration the three sheep were placed on a diet of wheaten straw chaff only (protein, 3·1 per cent.; Ca, 0·125 per cent.; P, 0·108 per cent.) for 39 days; all showed marked loss in weight. Reinfection of all sheep was begun, the deficient diet being improved somewhat by the addition of equal parts of oaten chaff. Both aged sheep on deficient diet were now found to be markedly susceptible, though the lamb on deficient diet was still resistant, as was that on normal diet. It is concluded that the age or acquired resistance of sheep to *H. contortus* may be broken down by adverse nutritional conditions, and it is suggested that the continued resistance of the lamb on deficient diet may be due to the occurrence of a genetic as distinct from an acquired immunity in some cases. The control of haemonchosis may be complicated by the increased susceptibility of aged sheep under unfavourable feed conditions.—H. McL. Gordon.

Kauzal, G., & Graham, N. P. H. (1933). **A Preliminary Survey of the Distribution of the Hookworm of Sheep in New South Wales.**—*J. Sci. & Indust. Res. Australia.* **6.** 189-190. [2 refs.]

The first record of the presence of *Monodontus trigonocephalus* in Australia was made in 1932. The authors carried out a survey by examining sheep at city abattoirs and in the field. At the abattoirs 39 cases were found in 456 sheep examined (8·6 per cent.). Individual infestations were generally light and were invariably accompanied by marked macroscopic lesions, usually in the form of haemorrhages into the mucous membrane of the duodenum. The average degree of infestation was 21·9 worms per sheep. In a few cases up to 100 worms were present. In the field 18 cases out of 58 sheep were found. Most of these infestations were extremely light, in some there being but a single worm present. The parasite is recorded from six "Pasture Protection Districts." With one exception, the actual properties where infested sheep had been lay on the eastern side of the Great Dividing Range. The heaviest infestations were found in the Upper Hunter River valley. There is no evidence to show that the parasite occurs south of the districts already found infested, that is, the southern portions of the state appear to be free. As it has been ascertained that the parasite at present has a relatively limited distribution in Australia, it should be possible to concentrate on eliminating the present source of infestation before further expansion of its distribution occurs.
—H. McL. Gordon.

IMMUNITY.

—. (1934). **The Double Intradermal Test for Tuberculosis.**—*J. Comp. Path. & Therap.* **47.** 67-73.

The article expresses the opinion that doubts regarding the value of the double intradermal test for the diagnosis of tuberculosis in cattle have been widely felt

in England since the method was first used in 1925, and attention is called to a recent case in which the application of the test in a small herd producing Grade A (tuberculin-tested) milk had disastrous results, since it led to the condemnation of nearly half of the animals in the herd on the false assumption that they were affected with tuberculosis.

The article recalls the fact that the double intradermal test was recommended by the Tuberculin Committee appointed by the Medical Research Council. This committee formed the opinion that the subcutaneous test was not a satisfactory test when carried out under ordinary farm conditions and they decided to adopt the method which had been used by CHRISTIENSEN and STUB in Denmark, namely, the intradermal injection of the tuberculin at a point in a shaved area on the skin of the neck, but modified to the extent that two injections separated by an interval of some days, were to be made at the same site in the skin.

The Committee were of opinion that the intradermal test as employed in America appeared to be superior to the subcutaneous test, but they fell into the curious error of supposing that this test was used in the United States because it was the only method practicable for the testing of ranch cattle, and they thought that British cattle could not well be restrained in a similar manner to that employed on ranches.

It is pointed out that the intradermal test did not originate in America, and that in the United States its employment is not limited to ranch cattle, but has been used, with strikingly successful results, in dairy and other herds.

It is held to be a significant fact that no country has adopted the test recommended by the Tuberculin Committee. Its employment in England was imposed by the Ministry of Health in cases in which owners of herds desired to obtain a licence to sell Grade A tuberculin-tested milk.

It is pointed out that the written certificates of the tests which are sent to the Ministry of Health represent the veterinary practitioner's individual judgment regarding the heat, consistence, form and sensitivity of the patch of skin and subcutaneous tissue at the place where the tuberculin was injected, and that these certificates, when they reach the Ministry of Health, cannot be reviewed or challenged like the temperature chart of an animal subjected to the subcutaneous method. In consequence, it cannot be expected that the Ministry of Health will ever obtain material on which to base a critical judgment regarding the value of the double intradermal test.

In conclusion the article expresses the opinion that none of the methods of tuberculin testing is perfect, but that there are two methods that have stood the test of trial on a huge scale, namely, the subcutaneous test and the original intradermal test, and that no country that can find the means to finance a scheme of eradication need now hesitate from fear that it would fail because of inability to diagnose the disease. When the object is to stamp out tuberculosis from a herd complete reliance should not be placed on one method of testing. When intelligently employed two different methods can reduce the chance of error to the vanishing point.—J. M'FADYEAN.

I. KLICH, P. (1933). Ist das Anaesotuberkulin von Finzi bei der Anwendung der intrapalpebralen Methode für die Tuberkulosediagnostik geeigneter als das Rohtuberkulin von Koch? [**Finzi's Anaesotuberculin in the Diagnosis of Tuberculosis by the Intrapalpebral Method**].—*Inaug. Diss. Berlin.* pp. 21. 1 table. [70 refs.]

II. LACHENSCHMID, B. (1933). Beitrag zur Feststellung der Rindertuberkulose durch die Novophymatin-Anergin-Augenprobe. [**Diagnosis of Bovine**

Tuberculosis by the Novophymatin-Anergin Eye Test].—*Deuts. Schlachthof-Ztg.* **33.** 337-341. 2 tables.

III. PAARMAN, E. (1934). Zur Serodiagnose der Tuberkulose. [**Sero-Diagnosis of Tuberculosis**].—*Deuts. tierärztl. Wschr.* **42.** 68-70. [22 refs.]

I. From intrapalpebral tests made on 88 animals, which were afterwards slaughtered and of which 39 were tuberculous, Klich concludes that Finzi's tuberculin is satisfactory and of greater diagnostic value than old tuberculin. The thermal reaction is of more importance than the swelling of the eyelid. Finzi's tuberculin is prepared from a 20 weeks' growth of a human strain by filtration through paper and the addition of 5 : 1,000 formalin to the filtrate.

II. The test described is not a reliable means of diagnosing tuberculosis in the early or in the advanced stage. Of 85 animals which were found to be tuberculous *post mortem* 15 per cent. gave no reaction, whilst amongst 51 animals in which no lesions were discovered 43 per cent. reacted.

III. The author claims that by using the benzol extract of WITETSKY, KLINGENSTEIN and KUHN [this *Bull.* **4.** 44.] the complement-fixing antibodies in tuberculous sera can be estimated quantitatively and that, in certain cases of animals suspected of open tuberculosis, clinical and bacteriological examination may therefore be unnecessary.—A. W. STABLEFORTH.

I. BIRKHAUG, K. E. (1933). Etude comparative de l'agglutinabilité et des propriétés pathogènes des colonies dissociées en S et R des Bacilles tuberculeux aviaire, bovin et humain. [**Comparative Study of the Agglutinability and Pathogenic Properties of S and R Colonies of Avian, Bovine and Human Strains of Tubercle Bacilli**].—*C. R. Soc. Biol. Paris.* **113.** 814-816. 1 table. [1 ref.]

II. HOLLANDE, A. C., & PENN, J. (1933). Méthode de recherche des agglutinines et des sensibilisatrices en présence d'un Bacille de Koch émulsionnable. [**Demonstration of Agglutinins and Complement-Fixing Antibodies with a Suspension of Tubercle Bacilli**].—*Ibid.* 889-890. [2 refs.]

III. LAPORTE, R. (1933). Cytologie des exsudats inflammatoires dans les réactions obtenues par injection intra-dermique de tuberculine. [**Cytology of the Inflammatory Exudate set up by the Intradermal Injection of Tuberculin**].—*Ibid.* 1409-1411.

I. The variants S and FS of avian tubercle bacilli are highly virulent for the fowl and the rabbit ; an intravenous injection of 0·01 mg. kills fowls in three to five weeks. In similar doses variants R and CH are inoffensive.

Variants S and FS of bovine and human strains do not cause lesions in fowls. In rabbits these variants in doses of 5 to 10 mg. set up the Yersin type of infection and cause death in 10 to 30 days. Bovine variant R rapidly brings about generalized tuberculosis and death in the guinea pig and rabbit. Human variant R sets up a progressive and fatal tuberculosis in the guinea pig, and a chronic localized infection in rabbits if given in large doses.

II. Hollande and Penn carried out serological tests with human sera obtained from patients affected with tuberculosis, and with sera from artificially affected animals (rabbits and donkeys), using an antigen consisting of young weakly acid-fast tubercle bacilli. These young bacilli, suspended in normal saline, provide an antigen that remains stable for some days.

With this antigen agglutinins and complement-fixing antibodies were readily demonstrated.

III. Laporte has studied the cytology of the skin exudates following intradermal tuberculin reactions in 58 tuberculous guinea pigs. Considerable differences

were observed in the exudates according to the depths from which they were obtained. A detailed description is given of the cells found.

These cell reactions are not specific, as they may be produced by setting up an irritation in the deep layers of the skin.—T. M. Doyle.

I. Rossi, P., & Saunié, L. (1934). Diagnostic de la brucellose des equidés par l'intradermo-réaction. [**Diagnosis of Brucellosis in Horses by the Intradermal Reaction**].—*C. R. Soc. Biol. Paris.* **115.** 134-137.

II. Rossi, P., & Saunié, L. (1934). Sensibilité de la peau du Cheval, vis-à-vis des antigènes brucelliques. [**Sensitivity of the Skin of the Horse to Brucella Antigens**].—*Ibid.* 137-140. 3 tables. [1 ref.]

III. Rossi, P., & Vigel, F. (1934). L'intradermo-réaction dans le diagnostic de la brucellose bovine. [**Intradermal Reaction in the Diagnosis of Bovine Brucellosis**].—*Ibid.* 248-250. 3 tables. [1 ref.]

IV. Rossi, P., & Vigel, F. (1934). Intradermo-réaction et brucellose bovine. [**Intradermal Reaction and Bovine Brucellosis**].—*Ibid.* 250-253. 2 tables.

V. Sarnowiec, W. (1934). Diagnostic de la brucellose bovine par les réactions d'allergie. [**Diagnosis of Brucellosis in Cattle by Allergic Reactions**].—*Ibid.* 380-383. [4 refs.]

I. The test was carried out on the skin at the side of the neck. The reactions and sequelae are described. In 26 positive and 46 negative horses tested, the results were very similar to those obtained by the agglutination test which was used as a control.

II. Killed brucella antigens, used either in the intradermal test or inoculated in large doses subcutaneously, did not sensitize the skin of the horse to a subsequent intradermal test, but did lead to the production of agglutinins which are demonstrable from the fifth day, increase for a short time and disappear after about two months. A positive skin reaction is thus evidence of actual infection and not of immunity.

The agglutinating titre of a reacting animal is not altered by the intradermal test.

III. The intradermal test, using *Br. abortus* antigen, was carried out in 18 herds affected with *Br. abortus* and one herd affected with *Br. melitensis*. The results showed that this test was reliable in both infections. The agglutination test was also carried out on these animals. The intradermal test picked out a few animals which were negative to the agglutination test. The animals had aborted.

IV. A successful second intradermal test can be carried out five to eight days after the first, either in the same caudal fold or in the other. Inoculation of dead vaccine does not interfere with the result of the test. Actual infection is required to give a positive reaction.

The antigen used in the intradermal test leads to the production of agglutinins in a non-infected animal after a delay of six days, whereas in infected animals the agglutinin titre is raised in two days.

Animals inoculated with living cultures gave a positive intradermal reaction after ten days.

V. Intradermal and agglutination tests were carried out at intervals in infected herds. Generally, the two tests gave similar results. Chronic cases, or those due to a very feeble organism, may give a negative result with the intradermal test, whereas the agglutination test is positive.—A. Brownlee.

Arciniega, A. (1933). La velocidád de sedimentación globular en los animales de la especie bovina con reacción positiva y negativa á la tuberculina. [**Velocity of Red Cell Sedimentation in Bovines Positive and Negative to Tuberculin**].—*Rev. Hig. y San. pec. Madrid.* **23.** 217-224. 4 figs., 1 table.

From his experience in a tuberculosis eradication campaign, the author has formed the opinion that eradication of the disease is not practicable with the tuberculin test and he has commenced to investigate a method of diagnosis based upon the rate of sedimentation of red blood cells. In the present paper he records results of the examination of blood from 114 cattle and correlates them with the animals' reactions to the intradermal test. The curves obtained by plotting the velocity of sedimentation after one, two and 24 hours were found to be independent of age and to ascend slowly at the second hour and rapidly at the 24th hour in animals giving negative reactions to the intradermal test. Rapid ascent at the second hour with descent at the 24th hour were noted in positive reactors.

No details of the technique are given and the graphs are incompletely explained [see also this *Bull.* **3.** 45].—R. S. Roberts.

Dubois, C., & Brune, C. (1933). Diagnostic expérimental de l'avortement épizootique des Bovidés par la recherche des réactions d'allergie. [**Experimental Diagnosis of Contagious Abortion of Bovines by Investigation of Allergic Reactions**].—*C. R. Soc. Biol. Paris.* **112.** 1297-1300. 1 table. [3 refs.]

The agglutination and intradermal tests for *Br. abortus* infection were compared in four herds. The intradermal test consisted of an inoculation into the caudal fold of 1 c.c. or less of killed concentrated antigen (five thousand million per c.c.). A control inoculation with *Bact. typhosum* was made into the other fold.

In a herd of 12 cows, most of which had previously aborted and all of which had been inoculated with live *Br. abortus* vaccine, all animals gave positive reactions to both tests. In a herd of 41 bovines, 22 reacted to the agglutination test and the two tests were in agreement for 27 animals. In two other herds nine cows and five heifers respectively gave negative reactions to both tests.

Positive reactions to the intradermal test consisted of oedematous swellings varying from the size of a pea to that of a pigeon's egg and persisting for several days.—R. S. Roberts.

I. Dubois, C., & Doutre, E. (1933). Dépistage des *Brucella* chez le Porc, par la recherche des réactions d'allergie. [**Intradermal Test for the Diagnosis of Brucellosis of Pigs**].—*C. R. Soc. Biol. Paris.* **114.** 681-684.

II. Dubois, C. (1933). Dépistage des *Brucella* chez la Poule par la recherche de réactions d'allergie. [**Intradermic Test for the Diagnosis of Brucellosis of Fowls**].—*Ibid.* 1045-1047. [1 ref.]

I. Dubois and Doutre tried the value of an intradermal test for the diagnosis of porcine abortion. The antigen consisted of a heat-killed suspension of a porcine strain of *Br. abortus*, a dose of 0·4 c.c. being injected intradermally at the base of the ear. The method was tested on both artificially and naturally infected pigs. The authors mention that the number of animals tested was too small to permit of a definite conclusion, but suggest that the method may be of practical value for the diagnosis of brucellosis of pigs.

II. Dubois tested the diagnostic value for the fowl of a killed *Br. abortus* antigen injected in a 0·1 c.c. dose into the inferior border of the wattle. A positive reaction was revealed by an oedematous swelling varying in size from a lentil to a three-penny piece and an increase in thickness of two to three times the normal dimensions of the wattle. The swelling appeared about the 8th hour, reached its maximum about the 24th hour and disappeared between the 60th and 72nd hour. The specificity of the reaction was controlled by the intradermal injection of a heat-killed *Bact. typhosum* antigen. Most of the fowls showed positive reactions

to both antigens. In addition two fowls gave positive agglutination reactions with a *Br. abortus* antigen and one fowl a positive agglutination reaction with a *Bact. typhosum* antigen. Evidence is given that the fowls contracted the brucella infection from contact with sheep and goats and the *Bact. typhosum* infection from human typhoid carriers.—T. M. DOYLE.

MARTINEZ, C. Ruiz. (1933). Un caso de reacción alérgica positiva en un caballo atacado de ascárides. [**A Positive Allergic Reaction in a Horse Infected with Ascarids**].—*Rev. Hig. y San. pec. Madrid.* **23.** 245-247.

The diagnosis of ascariasis was arrived at from the case history, the horse having sustained repeated attacks of colic, and from the discovery of a few ascarid ova in the faeces. An injection of 0·1 c.c. of an alcoholic extract of ascarids in 5 c.c. of physiological salt solution was given subcutaneously. The horse immediately showed alarming symptoms of distress, and perspired profusely; dyspnoea and cardiac debility were marked. These symptoms lasted for five hours. Treatment for ascariasis was followed by complete recovery.—R. S. ROBERTS.

HILL, A. B. (1933). **Contributions to the Experimental Study of Epidemiology. A Study of Cage Age and Resistance to Environment.**—*J. Hyg. Cambridge.* **33.** 359-369. 3 figs., 7 tables. [2 refs.]

A study of present and past experiments in which mice were introduced into cages at various stages of a prevailing infection, usually at the rate of three or six per day. The data relating to *Bact. aertrycke* and *Pasteurella* suggest that variations in severity of exposure, as measured by prevailing death rate in the cage, continue to influence the power of survival even of mice that had lived relatively long in the cage. With *Ectromelia*, variations in prevailing death rate have a much less effect on survival time and at older " cage ages " the mice become relatively indifferent to exposure to higher death rates. It is suggested that exposure to risk gives a measure of the chance of fatal infection and of natural immunization in both cases, but that risk of fatal infection dominates in mouse typhoid and pasteurellosis, while the chance of effective immunization dominates in *Ectromelia* infection. —H. H. GREEN.

TOPLEY, W. W. C. (1933). **The Effect of Repeated Injections of a Bacterial Vaccine.**—*Brit. J. Exp. Path.* **14.** 408-412. [Copied verbatim from *Bull. Hyg.* **9.** 279-280. Signed by G. S. WILSON].

The purpose of this experiment was to ascertain whether repeated doses of a bacterial vaccine gave rise to a better immunizing response than a single dose. Mice were inoculated intraperitoneally at weekly intervals with 500 million formolized heat-killed organisms from a smooth virulent strain of *Bact. aertrycke*. After varying numbers of injections a group of 30 mice was withdrawn and tested, along with 30 non-vaccinated controls, for resistance to 1,000 living virulent *aertrycke* bacilli injected intraperitoneally. The results of the test were judged by (1) the mean time to death, (2) the proportion of survivors after 28 days, (3) the proportion of completely resistant mice at the end of the experiment, cultivation of whose tissues revealed no evidence of infection. Analysis of the figures showed that the mice became progressively more resistant up to the fourth or sixth injection, but that further injections of vaccine resulted in a decline in resistance. Mice receiving 13 inoculations, while considerably more resistant than the control animals, were no more resistant than those receiving only one inoculation. Evidence was obtained that the waning of immunity occurring after the sixth injection was strictly specific, and was not associated with a general lowering of resistance to other organisms,

such as *Pasteurella muriseptica*. No general conclusions are drawn from these results, the author being careful to point out that the sequence of events observed must be taken as applying to the particular conditions prevailing in this series of experiments.

DISEASES, GENERAL.

RUNGE, S., & WITKOWSKI, B. (1933). Z kazuistyki anatomo-patologicznej. 1. Gruzlica oplucny, pluc, nasierdzia i watroby u konia. 2. Gruzlica worka osierdziowego, nasierdzia i pluc u niedzwiedzia malajskiego. 3. Gruzlica oka u krowy. 4. Polip w oskrzelu u psa. 5. Calkowite nowotworowate zniekształcenie obu nerek u swini. [**Some Pathological Cases. I. Tuberculosis of the Pleura, Epicardium and Liver of a Horse. II. Tuberculosis of the Pericardium, Epicardium and Lungs of a Bear. III. Ocular Tuberculosis in a Cow. IV. Bronchial Polypus in the Dog. V. Neoplastic Transformation of both Kidneys in a Pig**].—*Wiadom. wet.* **15.** 321-332. 9 figs. [8 refs.] [Summary in German : abst. from orig.]

I. This paper describes the tuberculous lesions in the thoracic and abdominal organs of a horse.

II. Lesions of tuberculosis were found in a Malayan bear. A yellow milk-coloured liquid filled the abdominal cavity and the thoracic walls were covered with a fibrinous membrane. The pericardium was dilated and the lungs were compressed. Raspberry-coloured tubercles were amassed in the auricles of the heart valves. On the surface of the lungs were found numerous grey, bacon-like swellings of varied size. Microscopic examination confirmed the presence of tubercle bacilli.

III. Two swellings were observed on the eye of a six-year-old cow ; one of them perforated the cornea. On the cut surface of the eyeball there was a cheese-like mass, yellowish-white in colour, in the middle of which a dislocated lens was found.

IV. This paper describes a polypus in the trachea of an 11-year-old dog.

V. In a pig the right kidney was found to be cystically degenerated ; it weighed 2,205g. The left kidney was very hard and weighed 510g. The author considered the former lesion to be a cystic adenoma.—K. SZCZUDLOWSKI (LWÓW).

ORR, W., & DARLING, F. F. (1932). **The Physiological and Genetical Aspects of Sterility in Domesticated Animals.**—pp. 80. [28 pp. refs.] Edinburgh : Imp. Bureau Anim. Genet. [4to] [2s. 6d.] [With bibliography by M. V. CYTOVITCH].

This pamphlet is the first publication from the committee appointed by the Department of Agriculture for Scotland to enquire into the subject of sterility in domestic animals, and is addressed to veterinarians and investigators in this field of research. It is divided into three parts and contains an extensive bibliography.

Part I deals with the individual parts of the reproductive tract. It is pointed out that cervicitis usually yields to treatment when uncomplicated by diseases of the adjacent genitalia, but that when vaginitis or metritis is present concurrently with cervicitis the prognosis is not encouraging. It would appear that the tonicity and secretion of the cervix are controlled by the ovary and ovarian diseases and cervicitis are frequently found together. The consistency of the mucus secreted by the cervix is an important factor, since it both assists the entry of spermatozoa into the uterus and prevents harmful organisms from entering. Metritis caused by *Br. abortus* (bovine strain) is of a transient character and permanent sterility is

usually the result of a secondary infection supervening upon *abortus* infection. A cystic condition of the ovary is very frequently associated with an inflammatory condition of the uterus, as is also a persistent corpus luteum. The persistent type of corpus luteum is quite functionless in a proportion of cases, but in those cases where it is physiologically active it appears to suppress ovulation and uterine contractility.

Part 2 deals very briefly with the nutritional aspects of sterility. Recent work has shown that both vitamins A and B are concerned with ovarian activity. Lack of vitamin E causes temporary sterility from placental insufficiency.

Part 3 deals with some genetical causes of sterility. Malformation of the genital organs and the nature of freemartins are discussed. The failure to breed of certain hybrids is considered and the conclusions reached are that the degree of sterility tends to be parallel with the decrease in gametic affinity. Finally, attention is given to lethal factors and to the appearance of such monstrosities as bull-dog calves.—J. A. NICHOLSON.

KREDIET, G. (1933). Ovariaal weefsel in intersexueele varkens. [**Ovarian Tissue in Bisexual Pigs**].—*Tijdschr. Diergeneesk.* **60.** 865-876, 931-941 and 990-998. 15 figs. on 8 plates. [39 refs.]

An examination of 16 hermaphrodite pigs showed that the ovarian tissue corresponded to that of normal pigs with the difference that the follicles were atretic and reduced in number. Graafian follicles with normal egg cells were rarely seen. Corpora lutea were absent.

In hermaphrodite pigs, the ovarian tissue tends to disappear and the testicular tissue to persist.

In one case evidence of a successful ovulation was found [this *Bull.* **3.** 495].
—B. J. C. TE HENNEPE (ROTTERDAM).

CAMPBELL, D. M. (1934). **Shifting Lameness in Horses.**—*Vet. Med.* **29.** 29-43. 11 figs., 2 tables. [9 refs.]

A discussion of osteodystrophias of the horse from the clinical and dietetic aspects with special reference to osteomalacia of horses in the Philippine Islands and in Indiana. KINTNER and HOLT [this *Bull.* **3.** 264.] held the former to be an osteomalacia due to excessive phosphorus in the ration [THEILER (1934). *Vet. J.* **90.** 143, defines this as " osteofibrosis "]. Affected animals are constantly shifting about and resting their legs : they lie down often and are stumblers. An alteration from timothy grass hay to alfalfa cured the condition in a spectacular manner (in the conditions of an experiment carried out). Affected horses show widespread arthritis similar to that found by MITCHELL in Scotland [this *Bull.* **4.** 375].

The author also quotes from the literature on obscure lameness in horses in an attempt to form some views as to aetiology.

Osteofibrosis (bran disease, " pitirosi ") is also reported from Italy [this *Bull.* **4.** 380 and 440].—J. E.

PILLERS, A. W. N. (1933). **Some Observations on Periodontal Disease in Adult Cart-Horses.**—*Vet. Rec.* **13.** 1404-1410. [9 refs.]

A valuable systematic review and description from the clinical aspect of what is commonly called alveolar periostitis. The question of secondary disease due to focal infection of a tooth is also discussed and instances of nasal gleet (sinusitis), tumours of the jaw, tetanus, acute cellulitis of part of the head, colic and what is termed brachial neuritis (functional lameness) are given as an example. Some cases of arthritis and tendinitis are also believed to be due to periodontal disease.

An interesting discussion followed at the meeting at which this paper was presented.—J. E.

NOVÁCEK, A. (1933). Epidemiologické postrehy pri infekcni bronchitis a broncho-pneumonii skotu. [**Epidemiological Observations on Infectious Bronchitis and Broncho-Pneumonia in Cattle**].—*Zverol. Obzor.* **26.** 181-192, 202-205, 221-232, 241-252, 261-268 and 288-293. 12 charts. [38 refs.] [Summary in German : abst. from orig.]

An outbreak of infectious bronchitis and broncho-pneumonia in several herds of cattle enabled the author to study the clinical picture of this disease. It was characterized by catarrhal affection of the upper parts of the respiratory organs and of the conjunctiva, accompanied in many cases by bronchitis, rarely by broncho-pneumonia. The most severe form of the disease was that accompanied by broncho-pneumonia. The following bacteria were isolated from the lungs of slaughtered animals :—a pasteurella, *B.* [*Corynebact.*] *pyogenes* and streptococci. They are not the responsible aetiological agents in the production of the disease, but they have an unfavourable influence upon its course.—E. PRIBYL (BRNO).

POU, M. C. (1933). El cancer ocular en los Bovinos del Uruguay. [**Ocular Cancer of Cattle in Uruguay**].—*Bol. mens. As. nac. Med. vet. Cuba.* **2.** 379-387. 1 fig.

According to statistics compiled in an abattoir at Montevideo ocular cancer occurs in 1·5 per 1,000 bovines in Uruguay. There is no evidence that similar neoplasms are common in other parts of the body nor that neoplasms in animals other than bovines show a predilection for this site. Nearly all the cases encountered were in Hereford cattle, more especially in those with unpigmented skin around the eyes. The neoplasms generally arose from the conjunctiva at the nasal canthus, but some were observed in the cornea. Those examined histologically were shown to be epitheliomata.—R. S. ROBERTS.

CARRÉ, H. (1933). Impétigo chez l'Agneau. Son étiologie. Son traitement. [**The Cause and Treatment of Impetigo in Lambs**].—*Rec. Méd. vét.* **109.** 394-399. [2 refs.]

This paper gives a description of three cases of impetigo in young lambs. The lesions, which were of the nature of superficial pustules, showed a marked resemblance to the eruption seen in dog distemper. In each case there was an associated derangement of the alimentary tract : moreover, recovery from the enteritis coincided with a disappearance of the pustules.

Cultures from the lesions yielded a staphylococcus in pure culture, but this organism was incapable of setting up infection since the transference of the pus to the scarified thigh of an experimental lamb was without effect. The condition is regarded, therefore, as an intoxication of alimentary origin.—R. E. GLOVER.

BLAKEMORE, F. (1934). **The Leucocytes of Fowl Blood with Special Reference to Fowl Paralysis.**—*Vet. Rec.* **14.** 417-422. 1 fig., 6 tables. [11 refs.]

The author rightly observes "It is obviously necessary to determine the variations that may occur in the blood of normal fowls." [This fundamental point appears to have received little or no attention from some recent workers].

A Thoma-Busch haemocytometer was used for the total count and Blain's (1928) method for the total leucocytic counts. Films were stained with Leishman's stain and 400 leucocytes were counted in each case.

Four groups totalling 19 normal fowls were examined for the normal leucocyte

counts. These counts varied from 13,300 to 36,000 per bird and the group averages varied from 17,750 to 33,300. It was shown that a considerable daily variation may occur.

The average total leucocyte counts of all the groups was taken as the arbitrary normal figure, but the author states that before accurate figures could be established it would be necessary to examine a very large series of fowls and determine the variations which may normally occur.

SHAW had recorded previously a marked difference between the morning and afternoon total leucocyte counts in pigeons, but the author found little evidence of such change in the blood of fowls.

In this investigation it was possible to make a study of the blood of 22 cases of fowl paralysis. These were divided into three groups, (A) birds showing tumours and enlarged nerves ; (B) those with enlarged nerves and (C) those in which macroscopic lesions were absent. The average total leucocytic counts of these three groups showed a variation as follows :— group A, 33,600 ; group B, 31,800, and group C, 29,700. Weighing various points the author considers that no importance can be attached to these slight variations. He further states that the leucocyte counts in the cases of fowl paralysis examined were not consistently high and in many instances barely exceeded the normal average. He considers that these variations make a total leucocytic count valueless for diagnostic purposes. Differential leucocyte counts were made on a series of birds affected with fowl paralysis. When a comparison is made with the average of the normal groups it is evident that the numbers of the lymphocytes were approximately equal in the two groups, but there was a considerable difference in the polynuclear averages. The polynuclear leucocytes are solely responsible for the numerical differences which exist between the averages of the diseased and normal birds.

In view of the non-specific variations which occur in the polynuclear cells it also appears extremely doubtful if any significance can be attributed to the differential percentage leucocyte counts in cases of fowl paralysis without reference to the total leucocyte count.—NORMAN DOBSON.

I. RAUTMANN. (1933). Die Bedeutung der Vererbung der Marek'schen Geflügellähme nach der Feststellung des Bakteriologischen Institut in Halle. [**Heredity in Fowl Paralysis**].—*Deuts. tierärztl. Wschr.* **41.** 597-599.

II. LERCHE, & FRITZSCHE, K. (1933). Histopathologie und Diagnostik der Geflügellähme. [**Histopathology and Diagnosis of Fowl Paralysis**].—*Zschr. Infektkr. Haust.* **45.** 89-109. 19 figs. on 5 plates. [11 refs.]

III. SEAGAR, E. A. (1933). **The Pathology of Fowl Paralysis, with Some Aspects of its Cause and Control.**—*Vet. J.* **89.** 454-473. 4 figs. on 2 plates. [11 refs.]

IV. SEAGAR, E. A. (1933). **Cellular Reactions in the Blood in Neurolymphomatosis Gallinarum (Fowl Paralysis).**—*Ibid.* 557-561. 7 figs., 1 plate. [1 ref.]

I. 210 eggs from 40 diseased hens were hatched and 76 chicks obtained. Within three months two-thirds of these showed symptoms. The experiment was hindered by a severe outbreak of coccidiosis. The survivors were observed for 12 months, during which period an 11 per cent. incidence of the disease was noted. Diagnosis was based upon histological examination of the nervous tissue, whilst all other possible causes of the symptoms were excluded ; thus the symptoms of intestinal coccidiosis can have a superficial resemblance to fowl paralysis. [For the possibility of transference of the disease through the egg see also this *Bull.* **2.** 611 and **3.** 638].

II. Reference to the original article is advised [see also this *Bull.* **2.** 343 and 611]. Histological changes are mainly confined to the nervous tissues. Nerves

show swellings and, microscopically, congestion of the capillaries and either a perivascular mantle of fibroblasts, a perivascular infiltration of lymphocytes or a diffuse type of infiltration. The central nervous system shows similar changes and frequently a proliferation of glial tissue. The ovary sometimes shows tumour formation, the liver and spleen rarely so. Possible portals of entry and the pathogenesis of a hypothetical aetiological agent are discussed. Without resort to histological methods a diagnosis depends upon the exclusion of other possible causes of the symptoms such as coccidiosis, tapeworm, lead poisoning, avitaminosis, botulism and disorders of the bones and joints.

III. The author claims to have transmitted typical fowl paralysis, from fowl to fowl, by intraperitoneal injection of suspensions of nervous or spleen tissue filtered through Berkefeld candles. The incubation period was generally over two months. Virus-containing material must be subinoculated when very fresh and must be inoculated intraperitoneally.

IV. An average differential leucocyte count for normal fowls, based upon 50 blood samples, is recorded, as follows :—total leucocytes 27,000, polymorphonuclears 39 per cent. (5 per cent. true eosinophiles), large and small lymphocytes 54 per cent., monocytes 5 per cent. and basophiles 2 per cent. Cases of fowl paralysis showed an increase in the leucocyte count by 20 to 30 per cent. but no pathognomonic changes were observed. It is thought that a marked rise in the lymphocyte count occurs in advanced stages of the disease [see also BLAKEMORE—this *Bull.* **4.** 532].—E. J. PULLINGER.

PAPPENHEIMER, Alwin, M., GOETTSCH, Marianne, & ALEXIEFF, Anna. (1933). **Nutritional Encephalomalacia in Chicks. Influence of Age, Growth, and Breed upon Susceptibility.**—*J. Exp. Med.* **57.** 365-371. 4 tables, 1 chart. [5 refs.]

The experimental work deals with a nutritional disorder of young chickens, characterized by severe injury to the central nervous system. The influence of age, growth and breed are discussed. The disorder can be induced by feeding a diet composed as follows :—

	Per cent.
Skimmed milk powder (Merrell-Soull)	15·0
Casein (Merck's technical)	20·5
Cornstarch	20·0
Lard	21·0
Cod liver oil (Mead Johnson & Co.)	2·0
Yeast (Fleischmann's bakers' dried)	5·0
Salt mixture (McCollum 185). (3)...	6·5
Paper pulp (Eastman)	10·0

Nutritional encephalomalacia may be induced in chickens up to the age of approximately two months.

It appears that the susceptibility to the disease diminishes as the preliminary period upon the natural food diet is extended. The disease tends to develop after a shorter period in the older chickens, although fewer of them become affected.

The chickens fed on the above special diet show a very indifferent growth compared with control birds fed on natural diet.

Experiments were carried out using White Leghorns, Rhode Island Reds, White Wyandottes and barred Plymouth Rocks ; all these birds appear to be equally susceptible.—NORMAN DOBSON.

BENNETTS, H. W. (1933). **Enzootic Ataxia of Lambs in Western Australia.**—*Austral. Vet. J.* **9.** 95-100. [2 refs.]

A general account of this disease was published previously [this *Bull.* **3.** 724]. More recent observations have confirmed certain statements made regarding the incidence and prophylaxis of the disease, and a further study has been made of the clinical symptoms and the pathology of the nervous system.

It was demonstrated experimentally that lambs affected with early signs of enzootic ataxia can be successfully reared on cow's milk. In lambs developing ataxia only when old enough to be weaned, the disease is arrested by removing them from their mothers. A detailed clinical description of the disease is given; acute, subacute and chronic types are recognized. The acute type affects lambs from birth until five weeks old, the symptoms being chiefly nervous. The subacute type is the most common and affects lambs from four weeks to three months old. Both nutritional and nervous symptoms are shown. The chronic type is seen in lambs three to four months old and is characterized chiefly by ataxia.

Degeneration of nerve fibres in the spinal cord, similar to that previously reported, was found in eight more cases examined. The areas involved correspond chiefly with what, in man, are the long ascending tracts. The medulla oblongata, cerebellum and nerves of the hind limb may also be affected with degenerative processes.—W. I. B. BEVERIDGE.

PIERCY, S. E. (1934). **"Cripples" in Lambs. I.**—*Vet. J.* **90.** 53-63. 11 tables, 3 graphs. [9 refs.]

An investigation into a disease in lambs which occurs on many Northumbrian farms and is characterized by imperfect osteogenesis. The disease is generally noticeable at 7 to 14 days old, and inability to use the limbs may lead to death from inanition and exposure; if able to reach the dam the lambs generally suckle well and eventually recover.

The theory that "cripples" in lambs is related to insufficiency of calcium and phosphorus in the food of the ewe is discussed and dismissed as untenable on the following experimental evidence:—(a) analysis of the pastures of a typical "cripples" farm (disease incidence 144 out of 222 lambs) showed a mineral content sufficient for normal sheep rearing; (b) ewes with "crippled" lambs were in good health and yielded normal milk; (c) supplementary feeding of 100 grazing ewes over the greater part of the gestation period on a specially prepared cake rich in minerals and cod liver oil did not prevent "cripples" in the lambs, and (d) the Ca and inorganic P of the blood of grazing ewes was much the same in the "fed" and "unfed" groups and the blood of "crippled" lambs showed no evidence of mineral deficiency.—H. H. GREEN.

PUBLIC HEALTH.

I. —. (1933). **Tuberculous Infection in Milk. A Report by the Department of Health for Scotland.**—*Med. Res. Council. Gt. Britain. Spec. Rep. Ser.* No. 189. pp. 38. 23 tables. [4to] [9d.]

II. DAVIES, G. O. (1933). **The Significance of (a) Acid-Fast Bacilli; (b) *Bacillus coli* in Milk.**—*Vet. Rec.* **13.** 1046-1061. [17 refs.]

III. —. (1933). **Tuberculous Milk.**—*Lancet.* **225.** 1380-1381. [5 refs.]

IV. —. (1933). **Tuberculous Infection in Milk.**—*Brit. Med. J.* Dec. 23rd. 1224-1225. [1 ref.]

I. The object of this enquiry was to attempt to arrive at some reliable estimate of the amount of tuberculosis infection in the different types of milk as distributed and consumed in the four principle cities of Scotland. For this purpose some 5,483 milk samples were examined biologically, using uniform methods throughout the centres concerned. A short chapter describes the details of milk sampling, whilst another deals in detail with the methods of the biological examinations. Two guinea pigs were used for each sample and all were tuberculin-tested before being used. The first guinea pig was killed four weeks after inoculation and if it proved negative the second pig was left for a further four weeks. It is shown that in over 36 per cent. of the positive cases the infection was only discovered in the second guinea pig. The unreliability of keeping guinea pigs used for such tests for one month only is clearly demonstrated.

A separate chapter is allocated to each type of milk examined.

(1) Raw milk is dealt with in two parts, samples taken from churns and samples taken from the large receiving tanks at creameries. The churn samples were representative of the total consignment of churns from individual farms and not from individual churns. The total number of such samples examined was 1,534 and of these 10 per cent. proved positive. It is shown that the greater the bulk, up to a maximum of 500 gallons, of milk from which the sample was taken the higher was the proportion of positive samples. A similar correlation is more clearly demonstrated in the samples taken from the tanks. The volume of milk in these receptacles varied from 30 gallons to over 3,000 gallons with an average of approximately 500 gallons. 207 such samples were taken and 37·5 per cent. were found to be infected. The correlation which exists between the amount of bulking and the proportion of positive samples found is clearly illustrated in table 6.

(2) Graded milks. These samples were collected from individual licensed herds and also purchased over the counter in retailers' establishments. This group includes certified and Grade A (T.T.) milk. Of the 329 certified samples there were no positives and of the 385 Grade A (T.T.) samples only one proved infected. The total percentage of infection in graded milks was thus less than 1 per cent.

(3) Heat-Treated milk. A division is made between samples treated by the holding and by the flash methods. Table 9 shows that out of the 291 samples treated by the flash method no less than 8·2 per cent. were positive. Of the 1,243 samples treated by the holding method 2·8 per cent. were proved positive. There is an indication that the percentage of infection in the holding process is materially reduced when the official standards of pasteurization are adhered to. The figures are, however, too small to establish this fact sufficiently.

(4) Retailed milk. Practically 10 per cent. of the 1,494 samples of retailed milk were proved positive. Roughly half of these samples were known to have been subjected to no form of heat treatment and of these 11·7 per cent. were found infected. The percentage of infection in those samples which were definitely known to have received some sort of heat treatment was 6 per cent. An appendix gives the details of the forms on which all the data of each sample were collected.

II. (a) A brief description of the general characters of acid-fast bacilli, together with their staining properties, is used as an introduction. There then follows a list and brief description of the pathogenic and saphrophytic members of the acid-fast group. In the case of the former, their association with the disease produced is mentioned as is also the probable likelihood and result of their presence in milk.

The possibility of the saphrophytic acid-fast bacilli vitiating the reliability of routine examinations and tests for the tubercle bacillus is considered. A detailed description of the microscopic picture presented by a sample of milk from a tuber-

culous udder is given. It is also explained how, with reasonable care, there is little chance of confusing the tubercle bacillus with any saphrophytic organism. The author points out that many of the cases where some confusion has arisen have been due to the presence of bacilli which appear slightly acid-fast through the improper decolourization of the specimen and which do not actually belong to the genus *Mycobacterium*. The result of the presence of tubercle bacilli in samples of milk exposed to the biological test is detailed and compared with the possible results given by the presence of saphrophytes. The result of reading this paper should be to dispel any doubts concerning the reliability of such tests, provided that the examinations are carefully carried out by experienced operators.

(b) It is shown how in faeces the coliform organisms present are *Bact. coli communis* in over 99 per cent. and *B. lactis aerogenes*, whose main source is soil, cereals and vegetation, in less than 1 per cent. As the presumptive test for *Bact. coli* does not differentiate between these two types, such a test is not reliable in indicating the nature of the contamination. The fact that the improper sterilization of the milking utensils is the chief source of *Bact. coli* contamination is confirmed.

III. The great increase in tuberculosis infection of milk due to bulking is again emphasized. The recently produced Scottish figures are detailed. It is interesting to note that the figure given for tank milk in Scotland (37·5 per cent.) varies very considerably from that given in the L.C.C. report (83 per cent.) and that given by F. C. MINETT and E. J. PULLINGER for London tank milk (100 per cent.). This is possibly due to the greater volume of milk from which the London samples were taken. The report shows the necessity of building up tuberculosis-free herds rather than relying on the Tuberculosis Order (1925) for safeguarding the raw milk supply. It concludes with the opinion that the only present safeguard is efficiently controlled pasteurization.

IV. The previously quoted Scottish figures are given and commented on. The effect of the bulking is illustrated by comparing the samples of churn and tank milk. The two methods of pasteurization as illustrated by the figures are compared and the necessity for rigid control emphasized.—L. JORDAN.

I. YALE, M. W. (1933). **Bacteriological Studies of a High-Temperature Short-Time Pasteurizer.**—*New York State Agric. Expt. Sta. Tech. Bull.* No. 207. pp. 30. 1 fig., 9 tables. [4 refs.]

II. TAPERNOUX, A. (1933). Recherches sur le diagnostic de la pasteurisation du lait de Vache. [**Detection of Pasteurization of Cows' Milk**].—*C. R. Soc. Biol. Paris.* **114.** 649-652. [3 refs.]

III. PICTON, L. J. (1933). **In Defence of Raw Milk.**—*Brit. Med. J.* Dec. 2nd. 1045.

I. This report contains the details of experiments which compare high temperature pasteurization for short periods with low temperature pasteurization for long periods, using the same milk. Laboratory and commercial methods, using the same types of pasteurization, are also compared. The results of these experiments show that (1) pasteurization at 143°F. for 30 minutes by a laboratory method yielded lower counts than pasteurization at 160°F. for 15 seconds by a laboratory method in 12 out of 15 cases ; (2) pasteurization by a laboratory method at 143°F. for 30 minutes yielded lower counts than pasteurization by a commercial method in 8 out of 10 cases and (3) pasteurization by a laboratory method at 160°F. for 15 seconds yielded lower counts than pasteurization by a commercial high temperature pasteurizer in 13 out of 18 cases. The details of milk sampling, bacteriological technique and the methods of pasteurization are all given.

II. Mention is made of three chief methods of pasteurization. A biochemical reaction consisting of the testing for peroxydase is illustrated to pick out

the milks which have undergone the high temperature pasteurization from the milks not heated or sour. Milk treated by low temperature apparently cannot be so diagnosed. The reaction to the Schern-Gorli ring test was also observed in the different types of milk.

III. In a letter to the *Brit. Med. J.* the author heartily condemns pasteurization and heat treatment of any kind. His arguments are expressed in an unusual but not very convincing manner. He appears to be a believer in the veterinary surgeon's ability to safeguard the raw milk supply by clinical examination of the cows' udders.—L. JORDAN.

—. (1933). Bact. Coli een indicator-organisme op onzindelijke melkwinning? **[Can *Bact. coli* be considered as an Organism indicating Unclean Milking?]** —*Ned. Tijdschr. Hyg. Microbiol. Serol.* **7.** 318-319.

In a cow which did not show noticeable defects of the udder, the milk from all four quarters, precautions being taken to prevent contamination, contained *Bact. coli*, and in one quarter it was found even in 0·000001 c.c. The teat seemed to have a slightly relaxed constrictor as the only anomaly. As apparently healthy cows can produce an enormous amount of *Bact. coli*, one should, therefore, not incriminate milking as the reason for the presence of these micro-organisms.

—J. VAN DER HOEDEN (UTRECHT).

BRYAN, C. S. (1933). **Preservation of Milk Samples with Brilliant Green for Streptococcus and Abortus Examination.**—*Amer. J. Publ. Health.* **23.** 1182-1185. [Copied *verbatim* from *Bull. Hyg.* **9.** 276. Signed by W. G. SAVAGE.]

The author finds that brilliant green in final dilution of 1 : 10,000 in the milk is sufficient to preserve milk samples without change for at least 20 days as regards the application of certain tests. The laboratory tests used for mastitis detection were—cultural, leucocytes per c.c., and percentage of chlorides and catalase. For the detection of abortus infection of the udder agglutination and cultural examinations were employed. The dye can be added to the sample bottle prior to collection or added subsequently, a one per cent. aqueous solution being used. Gentian violet in the same concentration can be substituted. [The experimental data submitted bear out the contention except as regards cultural examination of *Br. abortus* for which no results are given.]

BROOKS, E. B. (1933). **Importance of the Cat in the Transmission of Diphtheria.** —*Amer. J. Dis. Child.* **46.** 1338-1342. [18 refs.] [Copied *verbatim* from *Bull. Hyg.* **9.** 239. Signed by C. C. OKELL].

The paper opens with a brief review of the relationship of cats to diphtheria and is followed by the author's original observations. The Schick test was performed on 70 cats and kittens using a dose of 1/25 m.l.d. None of the animals showed a positive reaction. Injections of a standardized toxin, however, caused death in these animals, the minimum lethal dose for kittens being five times as great as the standard m.l.d. for guineapigs. Five cats were killed with 20 m.l.d. of diphtheria toxin per kilogram of body weight. The toxin was given subcutaneously. Four out of five cats given the same dose, but which were protected with antitoxin, survived. When virulent diphtheria bacilli were implanted on the normal or scarified mucous membrane of the cat's pharynx no disease resembling diphtheria developed though the bacilli survived as long as 24 hours, disappearing within 48 hours. Diphtheria bacilli spread on the fur of cats remained viable for as long as three days but no longer. The author concludes that though the cat does not in itself naturally suffer from diphtheria it may act as a carrier of the disease for a short time after being itself exposed to infection.

POISONS AND POISONING.

I. Stewart, J., & Wright, C. W. B. (1933). **A Preliminary Note on the Eradication from Pastures of Some Plants Poisonous to Livestock.**—*Third Rep. Direct. Inst. Anim. Path. Univ. Cambridge. 1932-1933.* pp. 298-301. [2 refs.]

II. Smock, S. C. (1933). **Common Plants Poisonous to Live Stock.**—*Vet. Bull. U.S. Army.* **27.** 347-352. [3 refs.]

III. Henry, A. (1933). Les intoxications d'origine vegétale. [**Plant Poisoning**]. —*Rec. Méd. vét.* **109.** 706-734. 3 tables. [1 ref.]

I. The authors describe work undertaken, as a logical sequel to the published reports of other investigators, in order to find the optimum concentration of chlorates for the eradication of certain poisonous weeds. The greater part of the report deals with the results obtained on plots containing *Ranunculus repens* ; the results indicate that a 3 per cent. solution, used as a spray, gave good results on a plot badly infested with *Ranunculus*, but that this concentration did not scorch the grass. A spray with 1 per cent. solution was found inadequate. A 5 per cent. solution scorched the grass badly. The results obtained on nettles and ground ivy were very inconclusive.

II. The characters and symptoms of poisoning by sneezeweed (Helenium autumnale), bread leaf laurel (Kalmia latifolia), narrow leaf laurel (Kalmia angustifolia), great laurel (Rhododendron maximum), poison hemlock (Conium maculata), Oregon water hemlock (Cicuta vagans), cowbane (Cicuta maculata), rattlebox (Crotalaria sagittalis), wooly loco weed (Astragalus mallissimus), stemless loco weed (Aragallus lambertii), black nightshade (Solanum nigrum), common horsetail (Equisetum arvense), rayless goldenrod (Aplopappus heterophyllus), and white snakeroot (Eupatorium uritucaefolium) are described. There is no sign in the paper that any of the statements are the result of original observation.

III. Though relatively little new information is to be found in this paper, it represents a valuable review of the present state of knowledge of poisonous plants and their effects. The scope of the paper is wide. The absence of more than one reference is explained on the basis that a complete list of references would have taken up too much space. The three tables should be of considerable value. The first endeavours to correlate certain leading symptoms with the plants of certain groups with a view to assisting differential diagnosis. The second is a list of the principal cyanogenetic plants and their glucosides. The third table concerns those plants containing a saponin.—Geo. F. Boddie.

I. Clawson, A. B. (1933). **Alpine Kalmia (Kalmia Microphylla) as a Stock-Poisoning Plant.**—*U. S. Dept. Agric. Tech. Bull.* No. 391. pp. 9. 1 fig., 2 tables. [15 refs.]

II. Nicholson, J. A. (1933). **Yew Poisoning in Domestic Animals.**—*Third Rep. Direct. Inst. Anim. Path. Univ. Cambridge. 1932-1933.* pp. 169-199. 16 figs. on 5 plates, 8 tables. [96 refs.]

III. Acharya, C. N. (1933). **Investigations on the Development of Prussic Acid in** *Cholam* (*Sorghum vulgare*).—*Ind. J. Agric. Sci.* **3.** 851-869. 7 figs. on 2 plates, 8 tables, 2 charts. [32 refs.]

I. The effects of this plant on cattle, goats and sheep have been investigated. As little as 0·3 per cent. of the body weight (calculated on the green plant) may cause symptoms in sheep, which are the most susceptible animals. A dose of 2 per cent. of the body weight causes dangerous though not fatal illness. The

chief symptoms are weakness, nausea, salivation and vomiting, developing within 3 to 14 hours according to the size of the dose and recovery is slow.

II. This paper reviews our knowledge of yew poisoning and records new observations, more particularly on the physiological effects of taxine, this alkaloid being the constituent of the leaves responsible for the poisoning. The effects of taxine are mainly on the heart and respiration. The alkaloid passes unchanged through the acid stomach, absorption being from the small intestine and it is rapidly eliminated from the blood stream, being most probably broken down by the liver.

The tolerance to yew, which is known to result from prolonged sublethal dosage, is to be ascribed either to power to destroy the alkaloid acquired by the intestinal cells, or to increased capacity of the liver cells in its removal from circulation.

Unfortunately little is known of the chemistry of taxine, but the author draws attention to its relative instability, complete detoxication appearing to result from ten minutes exposure to a temperature of 100°C. The toxicity of the leaves is about 1 g. per kg. body weight *per os*.

III. The prussic acid content of *Sorghum vulgare* falls from 0·2 or 0·3 per cent. in the early stages (about 20 days after sowing) to a negligible proportion at the flowering stage (about 100 days). About 60 per cent. of the total cyanogen content is in the leaves, the total showing diurnal variation from a minimum during the night to a maximum at about 2 p.m.

Drying at the ordinary temperature does not materially affect the cyanogen content which is, however, greatly reduced by drying at 100°C. or by the action of 10 per cent. sulphuric acid, but the most practical method of detoxication is by silage.

The proportion of cyanogen compound appears to be related to that of starch and a simple test may be made by staining a transverse section of the stem with iodine. If available prussic acid in proportions above 0·1 per cent. is present, the section will be stained dark blue or black as viewed by the naked eye.

—G. D. Lander.

THERAPEUTICS.

Ross, I. Clunies, & Graham, N. P. H. (1933). **Parasitological Field Trials with Sheep. Results at "Frodsley," Tasmania, and "Meteor Downs," Queensland.**—*J. Sci. & Indust. Res. Australia.* **6.** 191-204. 1 table, 1 graph. [4 refs.]

"Frodsley."—Routine monthly treatment with carbon tetrachloride and copper sulphate led to no increase in wool or body weight in sheep mainly infested with small Trichostrongylid worms. There was, however, a marked improvement in wool quality in treated compared with untreated sheep, so that it is probable that treatment mitigates somewhat the adverse effects caused by these parasites. Sheep on improved pasture, either with or without treatment, showed marked increase in body weight, and produced over 2 lb. more wool per head than the sheep on natural pasture, either treated or untreated. The only difference noted between treated and untreated groups on improved pasture was a slight improvement in wool quality of treated sheep. The wool of sheep run on improved pasture was estimated to give as high (or higher) percentage clean-scoured yield as that of any sheep on natural pasture. The administration of sodium arsenite and copper sulphate in licks had no demonstrable effect in diminishing infestation with large

bowel parasites, *Chabertia ovina* and *Oesophagostomum venulosum*. [See also this *Bull.* **3.** 489].

"METEOR DOWNS."—Treatment with carbon tetrachloride under the conditions prevailing through this trial led to no increase in the body weight in the treated animals as compared with untreated animals. Treatment with this drug led to no increase in fleece weight, nor significant difference in wool quality. It is thought that the very low rainfall contributed largely to the lack of evidence of harm caused by parasites.

As a result of the evidence obtained in this experiment, namely, that light to moderate degrees of infestation with *Haemonchus contortus* caused no interference with growth or with wool production, a trial has been commenced to investigate this point more thoroughly. The practical applications are possibly of importance, for should it be confirmed that sheep can tolerate a light to moderate infestation with worms — hitherto considered to be of some importance, depending upon the degree of infestation carried — without reduction of growth or wool production, it should mean that drenching could be concentrated on eliminating heavy degrees of infestation, and safeguarding against these when climatic conditions predispose to them.—H. McL. GORDON.

I. WALDMANN, O. (1933). Grundsätzliches zur Wahl von Desinfektionsmitteln bei Maul- und Klauenseuche. [**Fundamentals in the Choice of Disinfectants for Foot and Mouth Disease**].—*Berl. tierärztl. Wschr.* **49.** 485-486. [8 refs.]

II. HELM, R., & WEDEMANN, W. (1933). Desinfektionsversuche mit Trosilin bei Maul- und Klauenseuche. [**Disinfection Trials with "Trosilin" in Foot and Mouth Disease**].—*Deuts. tierärztl. Wschr.* **41.** 481-483. 1 table. [4 refs.]

III. REPPIN, K. (1933). Desinfektionsversuche mit Trosilin am Virus der Maul- und Klauenseuche. [**Disinfection Trials with "Trosilin" against the Virus of Foot and Mouth Disease**].—*Ibid.* 483-484. 4 tables. [2 refs.]

I. The action of acid is less certain than that of alkali for the destruction of the virus. Disinfectants should have a pH of 12·0 or over. The values of various specific disinfectants are discussed.

II. The authors were unable to show that "trosilin" solution was as efficient as caustic soda solutions of the same percentage concentration for the destruction of the virus. ["Trosilin," which contains active chlorine, was found to be useful in destroying swine fever virus — MIESSNER & GEIGER (1930). *Deuts. tierärztl. Wschr.* **38.** 1].

III. The foregoing findings with regard to "trosilin" are confirmed.

—E. J. PULLINGER.

MIETHKE, M., & WITT, G. (1933). Korrodierende Einwirkung von Oxychinol und Entozon auf verschiedene Einzelmetalle. [**Corrosive Action of "Oxychinol" and "Entozon" on Metals**].—*Arch. wiss. prakt. Tierhlk.* **67.** 44-45. 2 tables.

"Oxychinol" (0·5 : 1,000) and "entozon" (1 : 1,250) were tested for their corrosive action on iron, "V_2A" steel, zinc, copper, zinc-coated copper, nickel and aluminium. It was found that "oxychinol" corroded all except V_2A steel and zinc-coated copper whilst "entozon" only had a slight corrosive action on iron and zinc (24 hours exposure at 20°C. in every case).

These chemicals, used by SEELEMANN and SIEMONSEN in the treatment of mastitis [see next issue of this *Bull.*] can thus be safely used in certain metallic containers which resist corrosion.—J. E.

BAUDET, E. A. R. F., & DE BOER, E. (1933). Over het gebruik van derrispoeder, rotenon, teerpreparaten en terpentijn bij de bestrijding van de runderhorzellarve. **[The Use of Derris Powder, Rotenone, Tar Preparations and Turpentine in Warble Fly Control].**—*Tijdschr. Diergeneesk.* **60.** 639-647. 1 table. [7 refs.] [Summaries in English, French and German : abst. from orig.]

Excellent results were obtained with a newly prepared extract of derris powder recommended by GÖTZE in 1932 — an infusion of 1 : 9 in water that had stood for 24 hours mixed with one-ninth part of soft soap (1 : 4) solution — for the control of *Hypoderma bovis*. Usually one washing suffices, but if necessary it can be repeated two days later in order to kill all the larvae. Tar oil (2 per cent.) had the disadvantage of irritating the skin too much. Rotenone (2 per cent.) was non-irritant and gave good results as well. The results obtained with a mixture of tar, turpentine, soft soap, petrol and methylated spirit were not so satisfactory. The authors recommend derris powder in the form of a wash for mass control of the warble fly.—J. VAN DER HOEDEN (UTRECHT).

HENKELS, P. (1934). Zwei neue Narkoseapparate für alle Haustiere. **[Two New Forms of Anaesthesia Apparatus for Veterinary Practice].**—*Deuts. tierärztl. Wschr.* **42.** 65-68. 5 figs.

VÖLKER, R., & WEINGART, H. (1934). Die Aethernarkose des Pferdes, Schweines und Hundes mittels besonderer Apparaturen. **[Ether Narcosis of the Horse, Pig and Dog with Special Apparatus].**—*Ibid.* 82-86. 3 figs. [7 refs.]

The work forming the subject matter of these articles, both from the Hanover Veterinary College, has been inspired by the new Animal Protection Law of the German Reich, as the result of which the use of general inhalation anaesthesia is to increase in veterinary surgery.

Henkels describes an ether inhalation apparatus suitable for use in private practice. It consists of an ether chamber in a warm water bath, the concentration of ether inhaled depending on the temperature of the water, which is easily attended to by a lay assistant. Masks of various patterns for all animals are used in combination with the apparatus. Secondly, an oxygen-ether and/or chloroform pressure apparatus is described for employment within narrow limits of anaesthetic concentration suitable for use in a well-ordered clinic.

Völker and Weingart describe a small and handy ether apparatus suitable for smaller animals (pigs, dogs, etc.) working on the warm water bath plus variable air aperture principle. This apparatus has been much used and an experiment showing the effect on respiration and blood pressure in a dog anaesthetized with it is recorded.

These articles should be read in full by those interested in the theory and practice of general anaesthesia.—J. E.

I. VELU, H., & ZOTTNER, G. (1933). L'anesthésie générale par l'évipan sodique. **[General Anaesthesia with "Evipan"].**—*Rev. vét. milit.* **17.** 427-429. [Reprinted *verbatim* in *Bull. Acad. vét. France.* **6.** 407-409].

II. VELU, H., ZOTTNER, G., & IPOUSTÉGUY. (1933). L'anaesthésie par l'Evipan sodique en médicine vétérinaire. Avantages—Inconvénients. **[Anaesthesia by "Evipan" in Veterinary Medicine. Advantages and Disadvantages].**—*Maroc-Méd.* Dec. 15th. No. 138. 588-590. [Reprinted *verbatim* in *Rev. vét. milit.* **17.** 431-436].

III. HEGER, R. (1933). Das neue Narkotikum Evipan-Natrium (E-Na). [**A New Narcotic—"Evipan"**].—*Berl. tierärztl. Wschr.* **49.** 554.

IV. VON KNEBEL. (1933). Evipan-Natrium, ein neues Mittel zur intravenösen Allgemeinnarkose bei Hunden. [**"Evipan," a New Intravenous General Narcotic for Dogs**].—*Tierärztl. Rdsch.* **39.** 746-748.

V. STEFFENS, M. (1933). Die Evipan-Na-Narkose im Vergleich zu den bisher geübten Verfahren. [**"Evipan" Narcosis compared with the previously used Methods**].—*Ibid.* 844-848. [21 refs.]

VI. KARGER, W. (1934). Beitrag zur intravenösen Evipan-Natrium-Narkose beim Hund. [**Intravenous "Evipan" Narcosis of the Dog**].—*Deuts. tierärztl. Wschr.* **42.** 87-89. [15 refs.]

"Evipan," a proprietary preparation, is a barbituric acid derivative generally combined with sodium. It has been applied with success to human surgery and is given by intravenous injection. It must be injected very slowly (with a minimum of one minute for a small dose) and causes narcosis immediately. If the dose is computed purely according to body weight it may be insufficient and younger dogs are apt to struggle. Knebel has overcome this difficulty by the use of a second dose, kept ready at body temperature; if HINZ's ear reflex (shaking of the head) is produced when an ear is blown into strongly an additional dose is necessary.

"Evipan" causes a fairly short, but deep narcosis, suitable for the performance of small operations, e.g. for the extraction of teeth, removal of some tumours, etc. On recovery the dog first wakes up but is unable to stand. Excitable animals struggle a good deal unless kept very quiet.

I. This is a brief introductory note.

II. This gives case records of eight dogs and three horses.

III. The author gives a general review of the use of "evipan" in human surgery.

IV. Knebel had occasional difficulty with "pernocton" narcosis in dogs at the small animal clinic of the Berlin Veterinary College; this led to trials with "evipan" and he reports favourably on the results.

V. This is a valuable discussion of the literature on basal narcosis in the dog by morphia, chloral hydrate, "pernocton" and "avertin." The technique of "evipan" narcosis is described and experiments on 28 dogs are also described. As a result Steffens is not completely satisfied with its use in canine practice.

VI. The author gives a general description of "evipan" narcosis and an account of its use on dogs and because of irregular results he does not recommend it for general use.—J. E.

HOLE, N. (1933). **Chloral Hydrate as a General Anaesthetic for the Fowl.**—*J. Comp. Path. & Therap.* **46.** 47-49. 1 table. [4 refs.]

The experiments show that 2 to 4 c.c. of a solution of 1 g. of chloral hydrate in 10 c.c. of normal saline, inoculated intravenously, completely anaesthetized birds weighing about 3·6 lb. The birds were under the effect of the drug within 30 seconds to 2 minutes and remained with no corneal reflex for 18 minutes to one hour. The weight of the bird did not appear to influence materially the toxicity of the drug.

The M.L.D. appears to be 0·6 g. in 1 c.c. of saline.

The effect of the drug on respiration varied considerably. The small doses produced little change, but with larger ones the breathing sometimes became irregular and gasping; in other birds it remained regular but very shallow. There appear to be no after effects of the administration of this substance.

—NORMAN DOBSON.

PHYSIOLOGY.

I. —. (1933). **The Technique of Artificial Insemination.** pp. 56. 2 figs., 13 tables. [71 refs.] Edinburgh : Imp. Bureau Anim. Genet. [4to] [2s. 6d.]

II. Götze, R. (1933). Ueber die neuen russischen Methoden der künstlichen Besamung bei Haustieren. [**New Russian Methods of Artificial Insemination**]. —*Deuts. tierärztl. Wschr.* **41.** 801-807 and 820-824. 14 figs., 2 tables. [8 refs.]

III. Marvell, A. (1933). **The Artificial Insemination of Stock.**—*Vet. J.* **89.** 518-520.

I. This article is itself a summary of the present day knowledge of artificial insemination and, as such, is unsuitable for abstraction. Those interested are advised to refer to the original.

The subject is introduced in a chapter on the physiology of artificial insemination, written by A. Walton, who stresses the value of the research work carried out by workers in Soviet Russia led by Professor Ivanov.

Methods of collecting spermatozoa are discussed. The sponge collector is not considered satisfactory. The method of retrieving the sperm from the vagina with a spoon or by suction gives a poor yield. Roemmele's sperm collector consisting of a rubber cylinder fitted within the vagina is simple to use, whilst modern improvements have overcome the chief drawback, viz., the frequent failure of the male to insert the penis inside the collector. The artificial vagina consisting of a metal cylinder with an inner lining of rubber, the space between the rubber and metal being filled with water at 40°C., gives excellent results. The false vagina is held by an attendant and the penis is guided in, whilst the male mounts either a female on heat or even a dummy.

All apparatus used during artificial insemination must be sterile and free from all traces of metallic salts or disinfectants. Pure rectified spirit may be used for disinfection and it must be washed off with diluting fluid. Dry heat may also be used.

Sperm, when collected, should be examined macroscopically for colour, consistency and smell. Microscopically spermatozoa should show motility and the normal morphology, whilst cell débris must not be plentiful. A method for ascertaining the number of spermatozoa per unit volume is described as well as a mathematical procedure for calculating an " index of survival."

The technique for injecting sperm into the female is described in considerable detail. Injection must be made directly into the cervical canal, using a glass syringe and an ebonite catheter. The latter must not be introduced too far into the cervix for fear of introducing infection into the uterus. The optimal amounts of sperm for each class of animal are discussed. A chapter is devoted to the consideration of the best types of diluting fluid for the spermatozoa of various farm animals.

II. & III. These articles cover the same ground as above.

—E. J. Pullinger.

Dann, A. T. (1933). **The Chemical Composition of the Urine of Cows.**—*Austral. J. Exp. Biol. & Med. Sci.* **11.** 53-58. 2 tables. [18 refs.]

Examinations were made of urine samples from dairy cows of various breeds, under different conditions, and from two widely separated districts. The following estimations were made :—density, reaction, total nitrogen, hippuric acid, urea, ammonia, creatinine, uric acid, chlorides, phenols and sulphur. Those interested

should consult the original for the results, since in many instances the variations were so wide that the quotation of mean values may be misleading.

—W. I. B. Beveridge.

Watson, R. H. (1933). **The Threshold for the Renal Excretion of Inorganic Phosphates in the Sheep.**—*Austral. J. Exp. Biol. & Med. Sci.* **11.** 197-207. 6 figs., 1 table. [12 refs.]

Usually only a trace of phosphorus is present in the urine of sheep and most of this is inorganic. It was found that when the concentration of inorganic phosphorus in the serum was raised by oral administration of calcium phosphate or by starvation, phosphates were excreted in the urine. The threshold for renal excretion of inorganic phosphates in sheep varies in individuals and under different conditions in the same sheep, but it is relatively very high and permits of a considerable range of concentrations of inorganic phosphorus in the blood.

—W. I. B. Beveridge.

Watson, R. H. (1933). **Observations on the Secretion of Phosphorus in the Saliva of the Sheep.**—*Austral. J. Exp. Biol. & Med. Sci.* **11.** 67-74. 2 figs., 5 tables. [14 refs.]

Saliva was collected by tying small sponges in the mouths of sheep for 10 to 20 minutes and then squeezing the sponges onto a syringe. Total phosphorus and inorganic phosphorus were estimated in numerous samples the result being that the amount of organic phosphorus was found to be negligible. The concentration of inorganic P in saliva varied considerably, but was usually between 20 to 60 mg. of P per 100 c.c. It was computed that from 2·4 to 7·7 g. of P were secreted daily in the saliva.

There was found to be some correlation between blood P and the P content of saliva ($0{\cdot}42 \pm 0{\cdot}07$). The P content of both blood and saliva rose during starvation.

The large secretion of P in sheep's saliva, usually much larger than is the case in human beings, is thought to serve some purpose in digestion, possibly acting as a buffer against the organic acids produced by bacterial fermentation in the rumen.

—W. I. B. Beveridge.

Seddon, H. R., & Chamberlin, W. E. (1933). **On the Effect of the Administration of Sulphur to Sheep.**—*Austral. Vet. J.* **9.** 154-159. 1 fig., 7 tables. [2 refs.]

Two groups each of seven 13-month-old wethers were selected for evenness in body weight, conformation and wool quality. To one group 10 g. of sulphur was administered thrice weekly. All sheep were run together on pasture and the controls yarded each time sulphur was administered to the other group. The experiment was continued for two years. Neither in body weight, nor in total or average fleece weights, did the sheep receiving sulphur show any material advantage over the other group. There was no appreciable difference in haemoglobin and red cell volume in the two groups.—H. McL. Gordon.

I. Seddon, H. R. (1933). **Some Experiments Concerning the Effects of Mineral Licks on Sheep. I. The Effect on Body Weight and Wool.**—*Austral. Vet. J.* **9.** 122-132. 1 fig., 13 tables.

II. Lines, E. W. L. (1933). **An Experiment on the Effect of an Iodised Lick on the Growth and Wool of the Australian Merino Sheep.**—*J. Sci. & Indust. Res. Australia.* **6.** 181-188. 2 figs., 4 tables. [9 refs.]

I. In the first experiment all groups of sheep were run together at grass, but

each group was penned separately on alternate days (being then hand-fed) when mineral licks were available to certain of them. In the second experiment all sheep were run together continuously, minerals being administered by hand to certain groups three times a week. The experiment was continued for three years, the sheep at the beginning being two-tooth Merino wethers selected for evenness of type. They were divided into three groups of five sheep. One group received no lick, one group received coarse salt and the other a mixture of two parts salt and one part bone meal. Lick consumption was determined every four weeks. The sheep in the salt group consumed from 46·5 to 62 g. per week, while those in the mixed lick group consumed from 93 to 112 g. weekly. During the first two years the percentage gain in body weight was greater in the groups receiving lick, but in the third year the reverse was the case, so that at the end of three years there was little difference between the average weights.

In the second experiment one group was dosed with 45 g. salt weekly, one group with 45 g. salt and 22·5 g. bone meal, one group with a mixture of 45 g. salt and 20·6 g. bone meal, 1·0 g. ferri sulphas exsiccatus and 0·85 g. cupri sulphas ($5HO_2$). The administration of minerals as carried out did not appreciably influence body weight. Wool weights were likewise not significantly influenced. Wool quality and spinning counts were not affected in a significant manner though there were slight differences between groups. It was concluded that the withholding of minerals from sheep (a) entirely pasture fed and (b) partly pasture and partly hand-fed at Glenfield Veterinary Research Station was not attended by any serious effects on growth, bodily condition, wool yield or wool quality. The use of mineral supplements which the animals either took voluntarily or had administered to them was not followed by any material advantage, except perhaps that those receiving a phosphate-containing lick showed slightly greater gains in body weight during the first two years than the controls. No consistent improvement in wool yield or wool quality was manifested by any of the lick groups.

II. Increasing the intake of iodine by an average of 0·185 mg. per day for 47 weeks had no significant effect on the growth or wool production of lambs. Owing to variations in the pasture during the second experiment, lick was eaten during 19 weeks only, so that the average intake was much less than that in the first experiment, which was 0·720 mg. daily. Iodized licks, fed on the property where the experiment was conducted, failed to increase the iodine content of the thyroid glands of the sheep.—H. McL. Gordon.

Thomas, R. G. (1933). **The Distribution of Calcium Between Blood Plasma and Erythrocytes.**—*Austral. J. Exp. Biol. & Med. Sci.* **11.** 109-118. 1 table. [18 refs.]

Conflicting results obtained with different types of blood by various workers have led to considerable diversity of opinion as to whether blood corpuscles contain calcium. The author has now investigated the distribution of calcium between plasma and erythrocytes in seven oxen, four sheep, three pigs and three human beings using a technique which was very carefully checked for possible sources of error. The blood corpuscles of the pigs and human beings were shown to be devoid of calcium, those of the ox to contain an average amount of 6·1 mg. Ca per 100 c.c. of corpuscles, while with sheep the amount varied from 0 to 5·5 mg. The accuracy of the ratio of the volume of corpuscles to that of plasma as determined by the haematocrit was investigated. With the improved technique used the method was found to be accurate.

Since blood corpuscles are considered to be impermeable to sodium ions and it was found that those of sheep, ox and human beings behaved in the same way

to $CaCl_2$ solutions as they did to NaCl solutions of the same osmotic pressure, it is concluded that they are impermeable to calcium ions.—W. I. B. Beveridge.

Holden, H. F., & Freeman, Mavis. (1933). **Observations on the Proteins of Ox Serum.**—*Austral. J. Exp. Biol. & Med. Sci.* **11.** 185-195. 4 tables. [11 refs.]

The proteins of ox serum were separated out by various treatments with ammonium sulphate. Their optical activity was examined and their rotations found not to be constant. It is therefore suggested that the proteins are not single proteins, but variable and unstable mixtures. Experiments are described on the supposed *in vitro* conversion of serum albumin to serum globulin.

—W. I. B. Beveridge.

I. Miller, W. T. (1933). **Blood Volume Determinations in Cattle.**—*Rep. New York State Vet. Coll. 1931-32.* pp. 121-132. 3 tables. [8 refs.]

II. Oppermann, T. (1934). Technik und Indikationen der Blutuntersuchungen bei Haustieren. [**Technique and Indications for Blood Diagnostic Tests in Domestic Animals**].—*Deuts. tierärztl. Wschr.* **42.** 33-38. 3 figs.

III. Bollman, J. L., & Schlotthauer, C. F. (1934). **Some Blood Chemical Findings and their Interpretations in Diseases of Animals.**—*J. Amer. Vet. Med. Ass.* **84.** 151-162. [6 refs.]

I. The author made 105 blood volume determinations on 19 cows and heifers. The dye method was adopted. This consists essentially of taking a sample of blood and injecting intravenously a known quantity of a non-diffusible dye. Ten minutes later a second sample of blood is obtained. Both samples are centrifuged and the volume of corpuscles noted. A known quantity of dye is added to the uncoloured plasma and the samples are matched in a colorimeter. Having determined the dilution of the dye which has been in the circulation, calculation reveals the plasma volume, and hence the total blood volume can be calculated. The average quantity of blood per lb. body weight was found to be 27·07 c.c. Fluctuations in the weight of the animal were followed by changes in the blood volume ; similarly, during gestation, the blood volume increased as the weight increased. [Whilst this method is an advance on the older methods of determining the blood volume, it is not free from many sources of error, nor is it possible to determine whether the volume is absolute or simply relative].

II. Although blood examinations have been used to assist in the diagnosis, prognosis and treatment of numerous human diseases for many years, they have not been extensively employed in veterinary medicine for these purposes on the same types of disease. A complete blood examination can only be undertaken at an institute or clinic, but the author suggests that an examination limited to the determination of the sedimentation rate of the corpuscles, the relative proportions of red blood cells to white blood cells and the examination of blood smears would be of considerable practical value. Such an examination would reveal, for example, cases of acute or chronic infectious anaemia and parasitic conditions, and assistance would be given in the diagnosis of anaemic conditions in general.

III. In this paper the authors consider the significance of certain substances found in the blood. The formation of urea is increased in any infectious disease, fever, toxaemia, etc., but even with severe toxic destruction of protein the blood urea may not be increased unless there is injury to the kidneys. Adequate amounts of water must be secreted by the kidney to carry away the urea of the blood. The amount of glucose in the blood is not a reliable index of the level of carbohydrate metabolism. Death usually occurs when the blood sugar is reduced to about 20 mg. per 100 c.c. of blood. Lipaemia may be present after poisoning by ether,

chloroform, carbon tetrachloride, etc. It may also be found in certain forms of anaemia. An increase in the concentration of serum bilirubin is indicative of increased destruction of blood if the van den Berg reaction is indirect. If the reaction is direct, the excretion of bile pigment has been impaired, e.g. when the liver or bile ducts are sufficiently injured. Under ordinary conditions the chloride content of the body remains constant at about 550 mg. per 100 c.c. of blood, but it may be as low as 200 mg. per 100 c.c. in gastro-intestinal obstruction and related conditions.—J. A. Nicholson.

Dawbarn, Mary C., & Farr, F. C. (1933). **An Examination of the Amount of Iodine in the Thyroid Glands of Australian Merino Sheep.**—*J. Sci. & Indust. Res. Australia.* **6.** 179-180.

This is a brief recapitulation of the results obtained from a survey of the amount of iodine in the thyroid glands of Merino sheep. A detailed report was published previously [this *Bull.* **3.** 646]. No evidence of iodine deficiency in Australian sheep pastures was obtained.—W. I. B. Beveridge.

Kovács, J. (1933). Ueber die physiologische Atresie der Eierstock-Follikel und die interstitiellen Zellen. [**Physiological Atresia of the Ovarian Follicles and Interstitial Cells**].—*Arch. wiss. prakt. Tierhlk.* **66.** 32-46. 7 figs. [12 refs.]

Follicular atresia occurs in normal ovarian activity up to the end of the climacteric and is most noticeable in bitches at the beginning of sexual maturity. Atresia is first seen in the primary follicles and later, in old age, in the larger secondary follicles. It begins as a hyalin or fatty degeneration and eventually the cells of the theca interna grow up and completely fill the follicle. In atresia of the secondary follicles the granulosa cells are first affected. The spindle-shaped cells of the theca increase in size and form islands of characteristic interstitial cells which may be seen not only in follicles undergoing atresia, but also in follicles the ova of which have not been fertilized.—J. A. Nicholson.

Evans, H. M., Gustus, E. L., & Simpson, Miriam E. (1933). **Concentration of the Gonadotropic Hormone in Pregnant Mare's Serum.**—*J. Exp. Med.* **58.** 569-574. 1 table. [12 refs.]

The authors succeeded in isolating the gonadotropic hormone present in the blood serum of pregnant mares by adsorbing it on to aluminium hydroxide. The hormone was thus obtained in a concentrated form and its action was demonstrated on immature male rats, in which it caused an intense activity of the genital organs. —J. E.

I. Küst. (1933). Richtlinien zur Durchführung der hormonalen Trächtigkeitsfeststellung der Stute. [**Directions for the Hormonal Pregnancy Diagnosis Test for Mares**].—*Tierärztl. Rdsch.* **39.** 841-842.

II. Becker, M. (1934). Zur biologischen Schwangerschaftsdiagnose bei der Stute. [**Biological Diagnosis of Pregnancy in the Mare**].—*Ibid.* **40.** 91-95. 4 tables. [11 refs.]

I. Küst now states that the anterior hypophyseal hormones are present in the blood of pregnant mares from the 40th day with certainty and are absent after six months. The ovarian hormone on the other hand begins to be excreted in the urine at mid-gestation and remains present in great quantities till parturition.

Blood is therefore tested for pituitary hormone between the 40th and 150th days of gestation, and urine for the ovarian hormone after that period.

Detailed instructions for the collection and forwarding of material are given.

II. A concise review of the literature and an account of the author's comparative test with blood and urine for the diagnosis of pregnancy in a large number of mares. For early diagnosis he found the use of blood more reliable than urine and the blood test always gave an accurate result by the sixth week of gestation. Küst's findings with regard to ovarian hormone in the urine are confirmed.

—J. E.

TECHNIQUE.

I. Asheshov, I. (1933). **Study on Collodion Membrane Filters. Parts I. & II.** —*J. Bact.* **25.** 323-357. 7 figs., 3 tables. [5 refs.]

II. —. (1933). **Ultrafiltration in Bacteriology.**—*Lancet.* **225.** 1049-1050. [1 ref.]

I. Asheshov prepared thin collodion membranes from an alcohol-ether solution of nitrocellulose by pouring the fluid on to a level glass plate and allowing the solvent to evaporate at a known temperature for definite periods prior to gelation in water. Variations in permeability were secured by the addition of small amounts of acetic ether or formic ether. The membranes were mounted either on a disc in a Zsigmondy's funnel, or in a special apparatus, termed " twin-tubes," in which the membrane was held by two rubber washers clamped between the openings to two curved tubes. Many details for the exact preparation of these discs are given and should be consulted in the original by those interested. [It may be suggested that it is doubtful whether membranes prepared in this manner would prove as reliable in regard to graded porosity as the " gradocol " membranes of Elford in which the various factors governing the size of the pores are very exactly controlled].

II. This annotation in the *Lancet* reviews modern methods of ultrafiltration with special reference to articles by le Guyon and by Elford.—R. E. Glover.

Zieger, K. (1934). Eine neue Uteruspumpe. [**A New Uterus Pump**].—*Tierärztl. Rdsch.* **40.** 82-83. 1 fig.

Description of a new type of reversible pump recommended by the author for uterine irrigation in cattle practice. The instrument can either be used for pumping under pressure or for suction, the required action being quickly obtained by simply rotating the cylinder of the pump.—J. E.

MISCELLANEOUS.

I. Bresler, C. P. (1933). **A General Survey of the Veterinary Act, 1933.**—*J. S. Afric. Vet. Med. Ass.* **4.** 99-106 and 232-235 and **5.** 4-6.

II. Feced, R. (1933). Ministerio de Agricultura. Reglamento de Epizootias. [**Regulations Governing Epizootic Diseases [Spain]**].—*Semana vet.* **17.** 723-768.

III. Jekel, F. (1933). Das neue ungarische Veterinär-gesetz. [**The New Hungarian Veterinary Law**].—*Deuts. tierärztl. Wschr.* **41.** 695-696.

I. A commentary on the Veterinary Act passed in 1933 by the legislature of the Union of South Africa. The act established a Veterinary Board with a Registrar. Section 8 empowers the Governor General, after considering recommendations from the Veterinary Board, to prescribe what degrees or diplomas shall entitle to registration, but it is provided that no degree or diploma shall be accepted unless it is recognized in the country in which it was granted and is not lower in

standard than the Pretoria degree. The registration fee is £10. The Veterinary Board is empowered to enquire into charges of misconduct and may either remove the name of the offender from the Register, or may reprimand or suspend him for a specified period. The provisions governing the holding of such enquiries are fuller and better than those of the English Act of 1881, as they enable the Board to summon witnesses, pay witnesses fees and expenses, and to administer oaths. Section 17 prohibits an unqualified person from using a veterinary title, but there is no prohibition of practice by unqualified persons as there is in Hungary (see III below).

II. Under an act passed in 1931, creating a Central Department of Livestock and Cattle Industry, the veterinary services of Spain have been reorganized and correlated. This is the new Code of Regulations issued under the Act for the control of contagious diseases of animals. The code consists of 316 articles giving directions as to procedure in the case of every contagious disease met with in Spain. It regulates the import and export of animals and their transport by road, rail and water. Bacteriological laboratories maintained by the Ministry of Agriculture verify all suspected outbreaks and provision is made for quarterly statistical reports to be made to the Central Department.

III. A new veterinary act passed in 1928, replacing an act of 1888, came into force in Hungary on 1st April, 1933. It relates to the control of contagious diseases, and the hope is expressed that it will be a guarantee against the introduction of disease to countries trading with Hungary in animals and animal food products. The import and export of diseased animals or of animals suspected of disease is forbidden. Horses and cattle must be accompanied by individual certificates of health ; sheep, goats and swine may be imported or exported with a group certificate. The work of control is in the hands of 244 state veterinary officers and 488 local veterinary inspectors.

In Hungary unqualified persons are forbidden to practice as veterinarians.

—F. Bullock.

OFFICIAL AND OTHER REPORTS.

Government of India. (1933). **Annual Report of the Imperial Institute of Veterinary Research, Muktesar, for the year ending 31st March, 1933.** [Ware, F.] pp. 56. 12 tables. Delhi : Manager of Publications. [8vo] [2s. 6d.]

The usual administrative statistics are given. The anticipated appointment of a protozoologist has not yet taken place.

Research.

Report of the Pathology Section. [Datta, S. C. A.]

Johne's Disease.—Vaccination trials were continued but no favourable results were obtained.

Tuberculosis.—Work on the typing of bacilli from natural cases was continued. Two no-lesion reactors have been encountered.

Bursati.—Helminthic nodules have been found in 17 samples of skin from natural cases. The worm has been identified as *Habronema muscae*. One case showed both skin and stomach lesions in association with this parasite.

Bovine Nasal Granuloma.—The results of the work carried out last year were confirmed and reference is made to a snoring disease of cattle in Louisiana, U.S.A., which may be identical.

Bovine Enzootic Haematuria.—The implication of schistosomes reported in last year's report was not confirmed in later work.

Schistosomiasis in Horses.—Research showed that *S. indicum* has been found in a disease of horses known for many years and characterized by nodulation and enlargement of the liver.

Non-Sweating in Horses.—Pieces of skin from six cases showed atrophy of the sweat glands and fibrosis of the associated blood vessels.

Equine Paraplegia.—Nineteen cases at the Army Remount Depot at Sargodha were examined. The condition appears to differ from kumri.

Caseous Lymphadenitis in Sheep.—A case, believed to be the second observed in India, is recorded.

Helminthological Studies.—The implication of *Limnaea acuminata* as the intermediate host of *Fasciola gigantica* was proved experimentally in cattle and goats. The genus *Schistosoma* was studied with the object of clearing up the identity of species observed.

Report of the Serological Section. [Haddow, J. R.]

Rinderpest.—Goat virus for immunization of calves was further tested with favourable results. Serum plus goat virus vaccination is sufficient if any degree of reaction occurs. In some animals so treated, trials were made to exalt the immunity with a second bull-virus vaccination six months later. Their immunity will be tested in due course. The use of goat virus to eliminate the risk of protozoon infection is said to be useful for immunizing imported cattle, but not for indigenous cattle. An attempt is being made to conserve goat virus from deterioration during transport ; the use of spleen and brain tissue for this purpose has yielded some success. The duration of virulence of virus in blood appeared to be connected with the pH of the blood, the higher the pH the greater the viability. The addition of buffer salts of known pH tended to prolong the viability : at a higher pH virus remained in the tissue, whilst at a lower pH it passed into the surrounding fluid. It was found that half the previous usual dose of antiserum was quite effective in serum-virus immunization. Work on the fractionation of an immune serum was continued, practically all the antibody content being found present in the total globulin fraction. Alcohol precipitates were found superior to ammonium sulphate precipitates.

Other Diseases.—" Carbozoo " anti-anthrax vaccine was found effective, but caused large inoculation swellings. Formalinized whole cultures were found effective against blackleg. *B.* [*Pasteurella*] *pseudotuberculosis rodentium* was found in four out of seven cases of bovine lymphangitis. Amaurosis in calves was investigated at the Military Dairy at Quetta, together with abortion in cows. It is believed that mineral or other deficiency may be the cause of either or both conditions. Vaccination trials against equine contagious abortion were continued with no conclusive results. A second injection given [site not stated] one or two days after the intradermo-palpebral mallein test appeared to improve the reliability for the diagnosis of glanders in ponies.

Report of the Protozoology Section. [Sen, S. K.]

Trypanosomiasis.—Surra. The six treated ponies mentioned in the last report showed no symptoms of relapse in the 18 months observation period. One naturally infected case was cured by " Bayer 205 " (5 g. given intravenously, repeated after 30 days). The same treatment was applied to 12 bovines ; results so far are good.

Notes on *Tryp. melophagium* in sheep, *Tryp. theileri*, dourine and *Tryp. lewisi* in wild rats are also given.

PIROPLASMOSIS.—Piroblue was found equally as efficacious as trypan blue against *B. bigemina* in cattle. The natural theileriasis of cattle at Muktesar was studied by artificial infection. Experimentally the incubation period is 16 days and death usually follows in 3 to 11 days. The parasite appears to have most similarity to *Theilera annulata*. Seven protozoocidal drugs were tested for their curative action, but were all found useless.

OTHER DISEASES.—Seven out of 11 bulls, carriers of anaplasmosis, given repeated injections of trypan blue, suffered a flare-up in the disease. Attempts to transmit buffalo malaria to various birds failed.

ENTOMOLOGY.

The findings of CROSS that the tick, *Ornithodorus crossi*, can convey surra from rabbit to rabbit was not confirmed.

The life histories of some Tabanidae, Phoridae, Siphonaptera and Calliphora were studied. Several broods of *Calliphora erythrocephala* were reared.

ANNUAL REPORT OF THE DEPUTY DIRECTOR, IMPERIAL VETERINARY SERUM INSTITUTE, IZATNAGAR. [D'COSTA, J.]

The usual statistical information is given.—J. E.

DEPARTMENT OF AGRICULTURE, NEW SOUTH WALES. (1933). **Live Stock Diseases Report (No. 8), Recording Control Work during the Year ended 30th June, 1932.** [HENRY, M.] pp. 13. 3 tables. Sydney : Alfred James Kent. [8vo].

GLENFIELD VETERINARY RESEARCH STATION.

A record of the work carried out here will be published separately. The problems which received particular attention were enterotoxaemia and cutaneous myiasis in sheep and sterility in cattle.

INFECTIOUS DISEASES CONTROL.

BOVINE CONTAGIOUS PLEURO-PNEUMONIA.—There were 86 outbreaks involving 9,566 cattle, of which 312 died or were destroyed. But for one large " broadcasted " outbreak, which originated from a dealer's mob, the situation would have been very satisfactory. The means whereby this disseminated outbreak was effectively controlled are described in some detail.

ANTHRAX.—Twenty-nine outbreaks occurred, involving 79,251 sheep and 101 cattle ; 3,401 sheep and four head of cattle died. The incidence of the disease again appeared to be associated with grass seed infestation of the skin. The districts most seriously affected were the same as in previous years, but one outbreak was reported on a holding on which no anthrax had been known to occur for 20 years.

BLACKLEG.—This disease is usually experienced on the coast and tablelands, but during the year the first authentic outbreaks from the inland southern districts were reported. Contrary to usual findings here, one of these outbreaks, which was in calves, was found to be due to *Vibrion* [*Clostridium*] *septique*.

TUBERCULOSIS.—Under the tuberculosis-free herd scheme 4,554 cattle were tested, of which 0·19 per cent. reacted positively. Of 697 cattle tested for the first time, 0·43 per cent. reacted positively.

SWINE FEVER.—No outbreaks were recorded.

PIROPLASMOSIS.—Twenty farms were found infected and 29 cattle died of this disease. All recovered animals were disposed of. Most outbreaks did not appear to be directly associated with last year's outbreaks, but it is felt that they must be connected in some way.

The continued presence of tick fever raised the question of the desirability of inoculation, but as the affected area was small and geographically well defined, it was decided not to depart from the original policy of prohibiting vaccination.

Black Disease.—Amended regulations governing vaccination against black disease allow permits to be issued to veterinary surgeons, permanent vaccinators employed by firms manufacturing vaccines and stockowners on whose property the disease has been proved to exist. The inclusion of the last category was allowed with considerable reluctance, but certain considerations rendered it desirable.

The year's losses from black disease were among the lightest on record. The reason for this is not clear, but the fact that most sheep were not fat during the dangerous period may have had some influence on the low death rate.

Contagious Abortion.—Provision was made for the publication of lists of abortion-free herds on lines similar to those for tuberculosis-free herds.

Mastitis.—The general consensus of opinion among officers concerned is that vaccination when intelligently used is of value.

Control of Parasitic Infestation.

Cattle Tick Infestation.—During the year there was an extension of the area infested with cattle tick (*Boophilus australis*). The extension, which was one of the most serious since the tick entered the state, was due to a mob of infested cattle being driven by road for a considerable distance through tick-free country. Delay in reporting infestation was apparently due to owners mistaking the ticks for " scrub " ticks (*Haemaphysalis bispinosa* and *Ixodes holocyclus*) which are common in all coastal areas.

The situation regarding tick infestation and distribution and the control measures enforced are given in some detail. The policy followed was a slight variation of that previously in use ; in certain areas the schemes for eradication (treatments at 21-day intervals) had to be abandoned and a purely control policy of four treatments adopted.

Lice and Ked (*Melophagus ovinus*) Infestations of Sheep.—The situation regarding these parasites has not varied greatly, but collated reports showed that both parasites are widely distributed.

Poultry Diseases.

The tube agglutination test for *Bact. pullorum* infection has continued to give satisfactory results. It is considered that the work done has had a definite effect in checking the spread of this disease. Approximately 20,000 birds were vaccinated against fowl pox and more uniform results were obtained. A survey has been made of the incidence of neurolymphomatosis gallinarum. Although more or less widespread, the disease is not usually the cause of great loss. Field observations have not yet thrown any light on the aetiology of this condition. Coccidiosis and rickets have caused considerable trouble ; avian tuberculosis is apparently not common.

—W. I. B. Beveridge.

Queensland. (1933). **Annual Report of the Department of Agriculture and Stock for the Year 1932-33.** [Graham, E.] pp. 208. 189 tables, 1 chart. Brisbane : Frederick Phillips, Govt. Printer. [fcp].

This comprehensive publication contains the annual reports on all the activities of the Department of Agriculture and Stock. There is a wealth of statistical and economic data which should be seen in the original by veterinarians interested. Space permits of mention here only of subjects directly relating to animal health.

Report of the Agricultural Chemist.

Numerous analyses of dipping fluids, soils, grasses and fodders are described and tabulated.

Report of Seeds, Stock Foods, Fertilizers, and Pest Destroyers Investigation Branch.

Pasture improvement activities are discussed and comparative analyses of forage plants are tabulated.

Experiments were carried out in connection with stock poisoning by Sudan grass and sweet sorghums : analyses showed that Sudan grass contained less than half as much hydrocyanic acid as the sweet sorghums. The hydrocyanic acid content of all these plants decreased towards maturity, so that they are safe feed for stock when in full seed.

The Stock Foods' Acts require all commercial stock foods to bear a label showing their chemical analyses and the names of the materials from which the food was made. Over 400 samples of stock foods (including " licks ") were analysed and the results are tabulated. Some " licks " contain as much as 99 per cent. common salt.

Report of the Chief Inspector of Stock.

Buffalo Fly.—A survey revealed that, contrary to expectations, the buffalo fly [*Lyperosia exigua*] has not extended further east since the last survey. The fly has actually disappeared from some stations on which it was formerly present. These unexpected findings are attributed to the weather conditions prevailing since the last survey.

Pleuro-Pneumonia Contagiosa.—Twenty-three outbreaks were reported. This figure is lower than for several years. The number of outbreaks reported annually since 1928-1929 has shown a marked decline.

Tick Cleansing Areas.—Work on these three areas has been continued with satisfactory results.

Report of the Director, Animal Health Station.

The name of the Stock Experimental Station at Yeerongpilly has been changed to " Animal Health Station " and re-organization and extension have taken place.

Investigations on tick fever and pleuro-pneumonia in cattle and blowfly strike in sheep have received particular attention. Mastitis vaccine has given satisfactory results, especially when used prophylactically, due, it is thought, to the use of large doses. [No data are given on which these conclusions are based]. The value of including *Brucella abortus* in the mastitis vaccine, for use in herds where abortion is present, is being investigated.

Veterinary Officer's Report.

Investigations are being carried out on a disease of unknown aetiology in poultry. *Bacillus* [*Bact.*] *pullorum* infection in poultry was diagnosed for the first time in Queensland. Two blood parasites of cattle (*Anaplasma marginale* and a *Babesiella*), which were recently reported from the C.S.I.R. Animal Health Station at Townsville, have been seen here in blood smears. Enzootic haematuria has also been diagnosed. Other matters receiving attention were a condition of sheep suspected of being due to plant poisoning, and heavy mortalities in sheep due to pregnancy disease and arsenical poisoning.

Entomologist's Report.

Investigations were conducted at the Brisbane abattoirs on internal parasites of cattle. Information obtained indicated that *Haemonchus contortus* causes severe losses among calves, especially in the north.

Bacteriologist's Report.

117 animals have been immunized successfully against tick fever. Attention is drawn to the importance of the examination of blood smears from the 8th to

the 14th day after injection of " recovered blood." This is now done as a routine. Trypaflavin was injected intravenously into some animals which showed a severe reaction due to *Babesia bigemina*. The drug was thought to have a definitely beneficial effect as all these animals recovered.—W. I. B. BEVERIDGE.

SOUTHERN RHODESIA. (1933). **Report of the Chief Veterinary Surgeon For the Year 1932.** [SINCLAIR, J. M.] pp. 13. Salisbury : Govt. Printer. [fcp].

During the year the conditions were generally favourable for stock raising. Only two diseases cause any appreciable concern.

AFRICAN COAST FEVER.—Nine fresh outbreaks all originating from a previously known infected area occurred. Two outbreaks were " clear illustrations of delayed manifestation of infection after the dissemination of infected ticks." The disease was controlled by short-interval dipping and hand-dressing.

FOOT AND MOUTH DISEASE.—Considerable space is given to an account of this disease ; details are given of its behaviour in the various areas and of the methods used in controlling it. The following *verbatim* extract summarizes the position concisely :—

" It was indicated in my report for 1931 two of the methods recommended by the Director of Veterinary Research, Mr. Ll. E. W. Bevan, for the rapid spread of infection in areas likely to become infected were being adopted. The direct contact method, that is, the introduction of diseased animals, was carried out on a large scale in the Victoria area with very satisfactory results. In all other areas the intranasal method of inoculation was practised. The total number of cattle inoculated during the year was 185,388. The results were extraordinarily satisfactory, the reactions were invariably well marked, practically 100 per cent., excluding calves, and all signs of active infection had generally disappeared in less than four weeks from the date of inoculation. In two instances only was there any variation from the normal reactions ; in these, fresh cases of disease continued to appear up to thirty days from the date of inoculation. Inoculation, of course, cannot be successful unless a cattle-free belt is established between the area in which it is being carried out and the surrounding clean country. The method usually adopted was to concentrate the cattle for inoculation and, where feasible, move cattle not in immediate contact with infection outwards thus creating a cattle-free belt, both sides of which were strongly guarded."

Other diseases causing some loss include cutaneous myiasis (screw worm) in cattle, trypanosomiasis, anaplasmosis and piroplasmosis, heartwater in cattle, contagious ophthalmia in cattle, " sweating sickness " in calves, horse-sickness and sheep scab.—J. E.

JENSEN, C. O. (1933). Serumlaboratoriet 1908-1933. Oversigt over det videnskabelige Arbejde. **[The Serum Laboratory 1908-1933 (Copenhagen). An Account of the Scientific Work].**—*Maanedsskr. Dyrl.* **45.** 273-291 and 342-354. 1 fig. [142 refs.] [Also published as *Med. Stat. Vet. Serumlab. Copenhagen.* No. 137. pp. 32. 1 fig. [142 refs.]].

The present account has been prepared on the occasion of the 25th anniversary of the Institute. From 1908 to 1932 the laboratory was attached as a special department to the Royal Veterinary and Agricultural College. In 1932, it was, however, separated from the college and came under the Trade Directorate of the Board of Agriculture, which is also in charge of the civil veterinary administration. The diagnostic work and the production of serological and bacteriological preparations to be used in animal husbandry are essential parts of the work of the laboratory. The account of the scientific work gives an outline of the varied problems relating to pathology and bacteriology that have been dealt with during past years. A complete list of the 142 publications that have been issued from the laboratory is appended.—H. C. BENDIXEN (COPENHAGEN).

BOOK REVIEWS.

LINTON, R. G. [Ph.D., M.R.C.V.S., Prof. of Hygiene, Royal (Dick) Veterinary College, Edinburgh]. (1934). **Veterinary Hygiene.** pp. xix+472. 129 figs., 17 tables. [Numerous refs.] Edinburgh: W. Green & Son, Ltd. [2nd Edit.] [8vo] [21s.]

This is a revised and extended second edition of the well-known work published in 1921. In preparing the first edition the author wisely decided that it was impracticable to deal with all aspects of veterinary hygiene in a single volume and he accordingly omitted consideration of dietetics, zootechny and milk hygiene. This gap was largely filled by the publication in 1927 of Linton's "Animal Nutrition and Veterinary Dietetics," a text-book which, for students of veterinary hygiene in its widest sense, must be regarded as a complement to the volume now under consideration. The book is composed of six sections.

Sections 1 and 2—Water and Meteorology—remain substantially as in the first edition although that portion of the former dealing with the bacteriological examination of water has been rewritten.

Section 3—Sewage—contains new material in the shape of a more detailed account of the processes involved in sewage purification, subject-matter which the author deems it advisable to include on account of the frequency with which veterinarians are consulted in regard to the pollution of cattle-drinking water by sewage effluents.

Section 4—Air and Ventilation—covers every pertinent aspect of the subject and is increased in its comprehensiveness by the inclusion of descriptions of Haldane's portable CO_2 apparatus and of the Kata thermometer for determining the efficiency of ventilation in animal buildings and cattle-boats.

Section 5—Building Construction—has been augmented by 37 pages. The principal additional matter relates to the housing of poultry and goats, small holdings, dog-kennels and the stabling and management of horses in mines. All are subjects of no small importance at the present time and until now it has not been easy to obtain authoritative and conveniently placed references concerning them.

Section 6—The Control of Disease—replaces Sections 6 and 7 of the first edition which were devoted respectively to preventive medicine and sanitary law. The latter, which consisted of lengthy abstracts of the more important of the Diseases of Animals Acts and closely related regulations, has been omitted on the ground that when reference has to be made to such Orders a study of the original is the only satisfactory method of obtaining the desired information.

The number of specific diseases considered has been much reduced and, with a few important exceptions such as contagious bovine abortion, bovine mastitis and the contagious diseases of poultry, has been limited to those notifiable in Great Britain. The results of this revision are entirely satisfactory in that they release space devoted previously to diseases of limited importance for more detailed notice of those of greater consequence.

The addition to this section of a full description of dips and dipping is a noteworthy feature.

The book which is well printed, bound and indexed and is interleaved conveniently for notes, maintains fully the standard of the Edinburgh Veterinary Series. Its place as a standard work of reference for veterinary hygienists should be secure.—A. A. PRYER.

UDALL, D. H. [Professor of Veterinary Medicine and Superintendent of the Ambulatory Clinic at the New York State Veterinary College, Cornell University]. (1933). **The Practice of Veterinary Medicine.** pp. 267. 81 figs. [Numerous refs.] Ithaca, New York : D. H. Udall. [4to].

This book, the title of which is rather vague, actually deals only with the diseases of the domestic herbivora and swine, and is largely based upon the author's experience of over 20 years with his ambulatory clinic in New York State.

The subject matter is arranged in sections dealing with diseases of the various body systems, disorders of metabolism, infectious diseases (including bacterial, virus, protozoan and metazoan diseases) and poisoning.

The text is arranged in two columns under commendably clearly printed headings and subheadings : the figures are fitted in on the same pages and lack the clarity of the best type of illustration on art paper. Some of them are not characteristic and therefore are not very helpful.

This is not a comprehensive text-book and there are some unexpected omissions ; for instance, the only helminth infestations referred to are trichinosis and taeniasis and there is nothing about burns in the rather full section on skin diseases.

Whilst the teaching is not uniformly up-to-date, it is very practical and will be a valuable guide to the practitioner. Methods of treatment are gone into fairly fully and many prescriptions are included.

There is a good index, which offers no difficulty if the reader is acquainted with American veterinary terms.

The task of veterinary authors is often complicated by the necessity of describing conditions relating to different species of animals in one book. In the circumstances it is necessary to indicate clearly to which species a particular text applies : the book under review suffers occasionally from ambiguity in this respect.—J. E.

DUKES, H. H. [D.V.M., M.S., Prof. of Veterinary Physiology, New York State Veterinary College, Cornell University, Ithaca, N.Y.]. (1933). **The Physiology of Domestic Animals.** pp. xix+391. 218 figs., 49 tables. [Numerous refs.] Ann Arbor, Michigan : Edwards Brothers, Inc. [4to]. [There is an introduction on the physico-chemical basis of physiological phenomena by E. A. HEWITT and a chapter on reproduction by G. W. MCNUTT].

The student beginning the study of physiology is faced with a mass of facts, but with very few laws by means of which he may grasp the principles underlying the correct functioning of the animal body as a whole, and for this reason it is not an easy task to write a new text-book on physiology. The book under review fails to give anything but a brief account of isolated physiological phenomena, and no attempt is made to amplify those facts which are already well established and which have been repeated in innumerable text-books on physiology. A list of references is given at the end of each chapter and, as far as possible, the points raised in the text are illustrated by means of experiments on the larger domestic animals. A concise account is given of the mechanism of ruminant digestion and it may now be said that the mechanical factors associated with rumination have been definitely established. Unfortunately, many of the figures appear to be of little value in illustrating the text and many are so badly reproduced that it is impossible to distinguish the features that they are supposed to represent. Nevertheless, the

production of a text-book solely concerned with the physiology of the domestic animals must be welcomed, and the author and his collaborators are to be congratulated on their endeavour to fill a most important gap in veterinary literature.

The book is apparently produced by a photographic method of copying typescript.—J. A. NICHOLSON.

METALNIKOV, S. (1934). Rôle du système nerveux et des facteurs biologiques et psychiques dans l'immunité. **[The Influence of the Nervous System and of Various Biological and Psychological Factors on Immunity].** pp. 166. 26 figs., 1 plate, 12 tables, 5 charts. [121 refs.] Paris : Masson et Cie. [8vo] [Fr. 28].

In many respects Métalnikov may be regarded as the direct successor of METCHNIKOFF, for he has been particularly concerned with a continuation of the latter's classical studies on phagocytosis and immunity.

In the present book Métalnikov has endeavoured to harmonize the cellular theories of METCHNIKOFF with modern conceptions of immunity. The opening part is devoted to the reactions of unicellular organisms with special reference to "immunity of adaptation." In succeeding chapters it is pointed out that insects, in addition to the possession of an extraordinary immunity against highly pathogenic bacteria (*Mycobact. tuberculosis*, *Clostridium tetani*, etc.), which is exclusively related to their cellular defensive mechanism, can be very rapidly immunized against those organisms which are pathogenic for them (13 to 20 hours). The importance of the nervous system in the induction of this immunity is illustrated by experiments showing the rapid diminution in immunity which follows the destruction of specific nervous ganglia in the caterpillar and the transference of protection from one part of the body to another by way of the nervous system.

In the second part of the book, the role played by the nervous system in the higher animals is discussed. The author has been able to obtain typical immunological responses in association with conditional reflexes. He suggests that the fact that an external excitation (Pavlov's method) can suddenly change the leucocytic formula or augment the tenure of circulating antibodies, is an indication that the nervous system plays an important part in immunological reactions. He implies that possibly conditional reflexes are of fundamental importance in affording protection against various diseased conditions.

The links in his argument are set forth with commendable lucidity, but it is doubtful whether the majority of immunologists will entirely subscribe to his views on the relationship of the nervous system to immunity in the higher animals or to his contention that the humeral antibodies, etc. arise as a result of conditional reflexes.—R. E. GLOVER.

—. (1934). **Hutchinson's Popular & Illustrated Dog Encyclopaedia.** London : Hutchinson & Co. (Publishers), Ltd. About 50 weekly parts of 40 pp. each. [7d. each part].

The first number of this work contains several introductory chapters and includes the first few pages of the encyclopaedia proper, that is, information on everything canine arranged under alphabetical headings, which continues through the later numbers.

The work has all the points of the so-called popular publication and is profusely illustrated to bring out the points of modern breeds.

Some veterinary surgeons are contributing to the work.—J. E.